AMERICAN MUSEUM
Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, NY 10024
Number 3672, 72 pp., 410 figures November 30, 2009

The Goblin Spider Genus *Heteroonops* (Araneae, Oonopidae), With Notes on *Oonops*

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ABSTRACT

The goblin spider genus *Heteroonops* is relimited to include those soft-bodied oonopids with anteriorly situated, posteriorly directed projections on the endites of males, and elongated, highly spinose pedipalps in females, and is hypothesized to be natively circum-Caribbean. The type species, *H. spinimanus* (Simon), has attained a pantropical distribution, has been known only from females, and has therefore been hypothesized to be parthenogenetic. Although the species may have some parthenogenetic populations, males have apparently been collected together with females twice, once in the Seychelle Islands and once in Florida. We therefore place *Matyotia tetraspinosus* Saaristo (a monotypic genus and species established for that Seychelle specimen) as the male (and hence a junior synonym) of *H. spinimanus*; *Oonopinus hunus* Suman, described from Hawaii, is also newly synonymized with *H. spinimanus*, which is newly recorded from Mexico, the Bahama Islands, Colombia, Madeira, Madagascar, the Marquesas Islands, the Cook Islands, Pitcairn Island, Fiji, New Caledonia, and Queensland. Four specific names are transferred to *Heteroonops*: *Oonops singulus* Gertsch and Davis (from Mexico), *O. validus* Bryant (from Hispaniola), *O. castellus* Chickering (from the Virgin Islands), and *O. delegenus* Chickering (from Puerto Rico); *H. delegenus* is placed as a junior synonym of *H. castellus*, and the female of *H. validus* is described for the first time. Ten new species are described: *H. murphyorum* from Costa Rica, *H. andros* from the Bahama Islands, *H. spinigata* from Jamaica, *H. vega*, *H. iviei*, and *H. castelloides* from Hispaniola, *H. toro* from Puerto Rico, *H. croix* from the Virgin Islands, *H. saba* from Saba and Montserrat, and *H. macaque* from Dominica. Because the status of *Heteroonops* as a genus separate from *Oonops* Templeton has been questioned, we present a redescription of the family's type species, *Oonops pulcher* Templeton, based on topotypical specimens from Scotland; it is unlikely that any of the plethora of New World species that have been assigned to *Oonops* are actually congeneric with *O. pulcher*.

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 ISSN 0003-0082

INTRODUCTION

The goblin spider genus *Heteroonops* was established by Dalmas (1916), in a footnote, to contain the species *Oonops spinimanus* Simon (1891), described on the basis of females from St. Vincent and Venezuela. Dalmas argued that the spinose pedipalp, with a dilated patella, merited separation of this species from those of the genus *Oonops* Templeton (1835). The subsequent history of the genus has been marked by significant confusion.

Petrunkevitch (1929) apparently overlooked Dalmas' footnote, and recorded *Oonops spinimanus* from several localities in Puerto Rico. He described what he thought were the first males of the species, but Chickering (1969) expressed reservations about whether those males are actually conspecific with Simon's females, and later (Chickering, 1971, 1973) considered them to belong instead to *Oonops castellus* Chickering (1971), described from the Virgin Islands. Surprisingly, Chickering did not note that Petrunkevitch's Puerto Rican females may also have been misidentified, as both Petrunkevitch's illustration of the female pedipalp and his description indicate that the palpal tarsus lacks spines, and they omit any depiction or mention of the characteristic palpal patellar dilation. Unfortunately, as already indicated by Chickering, the specimens studied by Petrunkevitch are now in such poor condition that little can be gleaned from most of them; we have, however, been able to confirm that Chickering's identification was correct for at least one of Petrunkevitch's males.

Gertsch (1936) also overlooked Dalmas' generic placement, but recorded females of *O. spinimanus* from Florida, and Bryant (1940) added a record of females from Cuba. Chickering (1969) summarized the known records from Florida, commenting "I am not certain that the species should be separated from the genus *Oonops*, but for the present I am leaving it where Dalmas placed it." He subsequently reported on numerous specimens from Jamaica, the Virgin Islands, the British West Indies, Trinidad, Costa Rica, and Panama, indicating (Chickering, 1973: 227) that he had "spent much time in searching though my extensive collection of *Oonops* for males which could be matched with the well established females but without success."

The first indication that *H. spinimanus* might be more widespread was provided by Benoit (1977), who recorded a single female from St. Helena. Benoit considered *Heteroonops* to be supported by the presence of many leg spines on metatarsi III and IV, which he thought "sans équivalent dans la famille (chez *Oonops* la spinulation se limite aux [tibias] et métatarses I)." As indicated below, however, the type species of *Oonops* does have both tibial and metatarsal spines on legs III and IV. Benoit (1979) later added the first records of *H. spinimanus* from the Seychelle Islands.

Dumitresco and Georgesco (1983) presented a detailed description based on a single female from a cave on the Isla de Pinos, Cuba. In their view, only the female palpal spination separated *Heteroonops* from *Oonops*. Their female purportedly showed no dilation of the palpal patella, and they claimed that neither Simon nor Petrunkevitch had mentioned the character. This is not accurate; Simon's original description clearly indicates "Pedes-maxillares … patella intus, ad apicem, leviter dilatata et setis spiniformibus longis et erectis binis armata" (Simon, 1891: 563), and his illustration (ibid.: fig. 6), although showing the pedipalp only in lateral view, suggests the dilation (which is more readily seen in dorsal view, as in fig. 112; see also Chickering, 1969: fig. 30 and Saaristo, 2001: fig. 173). Just as with Petrunkevitch's (1929) Puerto Rican females, it is therefore possible that Dumitresco and Georgesco's Cuban female was actually misidentified. Unfortunately, the institution where Dumitresco and Georgesco's specimens were deposited (the Institut de Spéologie "Emile Racovitza" of Bucharest, Romania) declines to make them available to other researchers on loan.

Dumitresco and Georgesco (1983) also described a second species, under the name "*Heteroonops (?) colombi*." Again, they had only a single female specimen, from a cave on mainland Cuba; that female had lost both of its pedipalps, and they admitted that their placement of the species in *Heteroonops* was therefore debatable. Many of the females of

H. spinimanus in the collections we have examined are also missing both pedipalps; apparently the heavy spination can be detrimental as well as useful in grasping prey.

Sierwald (1988) confirmed the suggestion by Chickering (1971) that *Oonops bermudensis* Banks (1902), described on the basis of a single female from Bermuda, is a junior synonym of *H. spinimanus*. The most recent treatment of the species is by Saaristo (2001: 351), who recorded additional specimens from the Seychelle Islands. He thought that the species "has been well described by Dumitresco & Georgesco (1983)." That conclusion seems odd, as Saaristo (2001: fig. 173) presented an accurate illustration of the palpal patellar dilation that Dumitresco and Georgesco maintained did not occur in their specimen. Saaristo also offered some generalizations about the species: "This is a pantropical species originating from the tropics of the new world. So far, only females have been collected and the species is apparently parthenogenetic."

Unfortunately, Saaristo did not explain the reasoning behind either of those conclusions. Although the species was first described from the New World, Simon's specimens from St. Vincent and Venezuela could easily have been introduced from the Old World, as is apparently the case in *Opopaea deserticola* Simon, which was also first described from St. Vincent (in the same paper), but which is now considered to be introduced in America and native only to the Old World (Platnick and Dupérré, 2009).

Perhaps Saaristo reasoned from the description of *H. colombi* that the "center of diversity," and hence the origin of the genus, lies in the West Indies; such center-of-origin assumptions are dubious in general, and would be particularly tenuous in this case, given the uncertain placement and affinities of *H. colombi*. An even greater leap seems to have been involved in Saaristo's suggestion that the species is "apparently parthenogenetic." The only sizable collections of the species that have ever been reported in the literature are those taken by Chickering (1973: 228) in Jamaica ("where the species seems to be abundant"); he also reported having taken "many females" in the Virgin Islands, but in neither case did Chickering publish actual numbers of specimens. Saaristo's samples from the Seychelles total to eight adult females, hardly sufficient to justify a conclusion of parthenogenesis.

There are a few widespread, pantropical species of oonopids, and at least in the case of *Triaeris stenaspis* Simon (1891), also initially described from St. Vincent, and for which only females are known, parthenogenesis has now been demonstrated in the laboratory (Korenko et al., 2009). However, other pantropical oonopids, such as the three species treated by Platnick and Dupérré (2009), have normal sex ratios and have apparently attained their widespread distributions at least partly because of synanthropic habits, not because they are parthenogenetic.

Our interest in *Heteroonops* was first piqued by a pair of specimens collected in Costa Rica by John and Frances Murphy. The female involved shared the pedipalp features of *H. spinimanus*, and the male seemed equally distinctive, with peculiarly modified endites, each of which bears two longitudinally arranged, backward-pointing projections (figs. 153–155).

The only described oonopid known to us with such sets of paired, longitudinally situated projections on the male endites is *Matyotia tetraspinosus* Saaristo (2001), described for a single male from the Seychelle Islands. The projections in that species are considerably larger than those of the Costa Rican male (especially the posterior pair; see Saaristo, 2001: fig. 167). But we hypothesized that the feature might be a synapomorphy supporting the placement of *Heteroonops* and *Matyotia* as sister groups, and therefore began a thorough search for other male specimens showing such endite modifications, as well as other female specimens with elongated and spinose pedipalps.

In the United States, *H. spinimanus* is known only from Florida, but the collections from there are substantial, including over 250 specimens. Most of these collections contain only females, but one of the largest samples, taken in Monroe Co. by the late Wilton Ivie in 1962, includes, in addition to 18 adult females and some juveniles, one adult male. To our surprise, that male matches the holotype of

M. tetraspinosus, in both endite and palpal characters! The two sexes were not initially associated, as the Florida male was sufficiently distinctive in appearance that, during initial processing of the incoming collection, it had been placed by the sorter (probably Wilton Ivie himself) into a separate vial from the females and juveniles—albeit with identical locality labels (of which there was also an extra copy with the females, in case they themselves proved to be a heterogeneous sample).

Those Florida specimens were by no means the only oonopids collected by Ivie at that site, on that date, but upon rechecking the original description of *M. tetraspinosus*, we noted that the single male specimen studied by Saaristo (2001) was taken by him at Anse Cimitière on Silhouette, in the Seychelle Islands, on January 18, 1999. Interestingly, the only specimens of *H. spinimanus* collected by Saaristo were taken at that same locality on January 17 and 18, 1999. It seems unlikely that *Matyotia*, for which only two males are known, is a pantropical taxon that just happens to have been found only at the same place and time as has the supposedly parthenogenetic species *H. spinimanus*, in both Florida and the Seychelle Islands. Given the respective similarities to the males and females of the new Costa Rican species described below, we hypothesize instead that *M. tetraspinosus* is actually the male of *H. spinimanus*.

Obviously, we cannot rule out the possibility that there are actually some parthenogenetic populations of *H. spinimanus*; the large samples taken on Jamaica, for example, include only a few juvenile males, which could easily all belong to other species. Parthenogenesis is not the only possible explanation, however, for what may be just a biased sex ratio (in existing collections of this species, or even in its populations in nature). Adult males may simply be extremely short-lived and hence unlikely to be collected. Bacterial endosymbionts such as *Wolbachia* and *Cardinium* (both of which have been recorded in other spiders) also have effects that can include skewing the sex ratio toward females (Martin and Goodacre, 2009).

This hypothesized generic-level synonymy still left unexplained the past misidentifications of other species from the Greater Antilles as *H. spinimanus*. Our attention was again drawn to the paper on Cuban oonopids by Dumitresco and Georgesco (1983), as they recorded from Cuba specimens of the same species (*Oonops castellus*) that Chickering considered to have been misidentified as *H. spinimanus* by Petrunkevitch (1929). Their illustrations of the male palp do not actually match those provided for *O. castellus* by Chickering (1971), and we have seen specimens of *O. castellus* only from Puerto Rico and the Virgin Islands. Nevertheless, Dumitresco and Georgesco (1983: pl. 10, fig. 2) presented a figure of their Cuban male's endites that, although obscure, suggests that at least an anterior pair of backward-pointing projections might be present in those males as well, even though neither Petrunkevitch nor Chickering had observed such structures.

Our subsequent investigations of West Indian specimens confirmed that such projections do occur in *O. castellus* (figs. 271–273), and we therefore suggest that *Heteroonops* is indeed a valid genus, supported by synapomorphies in male endite structure as well as female palpal modifications. We recognize below a total of 14 species (not including *H. colombi*, which we consider to be incertae sedis); if our delimitation is correct, *Heteroonops* is a circum-Caribbean group, one species of which (the type species) has attained a pantropical distribution.

In support of this hypothesis, we also present a redescription of the type species of *Oonops* Templeton (1835). Although Templeton's description is detailed for its time, it does not even specify a type locality for the type species of the genus and family, *Oonops pulcher* Templeton, save that they were from his "immediate neighbourhood." Chickering (1970) indicated that Templeton's specimens were from Belfast, Ireland (where Templeton was born), but in the years immediately preceding the 1835 paper (apparently the only work on spiders Templeton ever wrote), Templeton lived in Edinburg, Scotland, and we have used specimens from there (kindly supplied by Michael Roberts) for our treatment. A study of these specimens indicates, unsurprisingly, that *Oonops* has been used largely as a wastebasket group for soft-bodied

oonopids. In particular, it seems unlikely that any of the 53 New World species currently attributed to the genus (see Platnick, 2009, for a listing) are actually congeneric with the type species. Certainly the species here treated as *Heteroonops* are not.

This study is based on examination of over 1,600 specimens from the collections listed below. Although we have surveyed the literature, to try to find any and all available names that might apply to the various species here assigned to *Heteroonops*, we have not been able to examine the type specimens of many of the described taxa that could conceivably belong to the genus (i.e., virtually any species, from anywhere, currently assigned to *Oonops*, or to *Oonopinus* Simon, or to *Oonopoides* Bryant, and possibly other soft-bodied oonopid genera as well). We fully expect our hypotheses about the delimitation and composition of the genus to be severely tested, and improved on, during forthcoming studies on these intriguing, soft-bodied oonopids by the many participants in the oonopid Planetary Biodiversity Inventory (PBI) project.

The methods follow those of Platnick and Dupérré (2009); the species are treated geographically, with North and Central American taxa followed by Greater and then Lesser Antillean species. Only differences from the males are mentioned in the descriptions of females; leg spination descriptions mention only those surfaces bearing spines. All measurements are in mm. Full color, high-resolution versions of the images will be available on the PBI website (http://research.amnh.org/oonopidae).

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York
BPBM	Bernice P. Bishop Museum, Honolulu
CAS	California Academy of Sciences, San Francisco
CNC	Canadian National Collection, Ottawa
FMNH	Field Museum of Natural History, Chicago
FSCA	Florida State Collection of Arthropods, Gainesville
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica
JAB	J. A. Beatty collection, Carbondale, Illinois
MCZ	Museum of Comparative Zoology, Harvard University
MNHN	Muséum d'Histoire Naturelle, Paris, France
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium
PMY	Peabody Museum of Natural History, Yale University
QMB	Queensland Museum, Brisbane, Australia
UAM	University of Alaska Museum, Fairbanks
USNM	National Museum of Natural History, Smithsonian Institution
ZMUT	Zoological Museum, University of Turku, Turku, Finland

SYSTEMATICS

Oonops Templeton

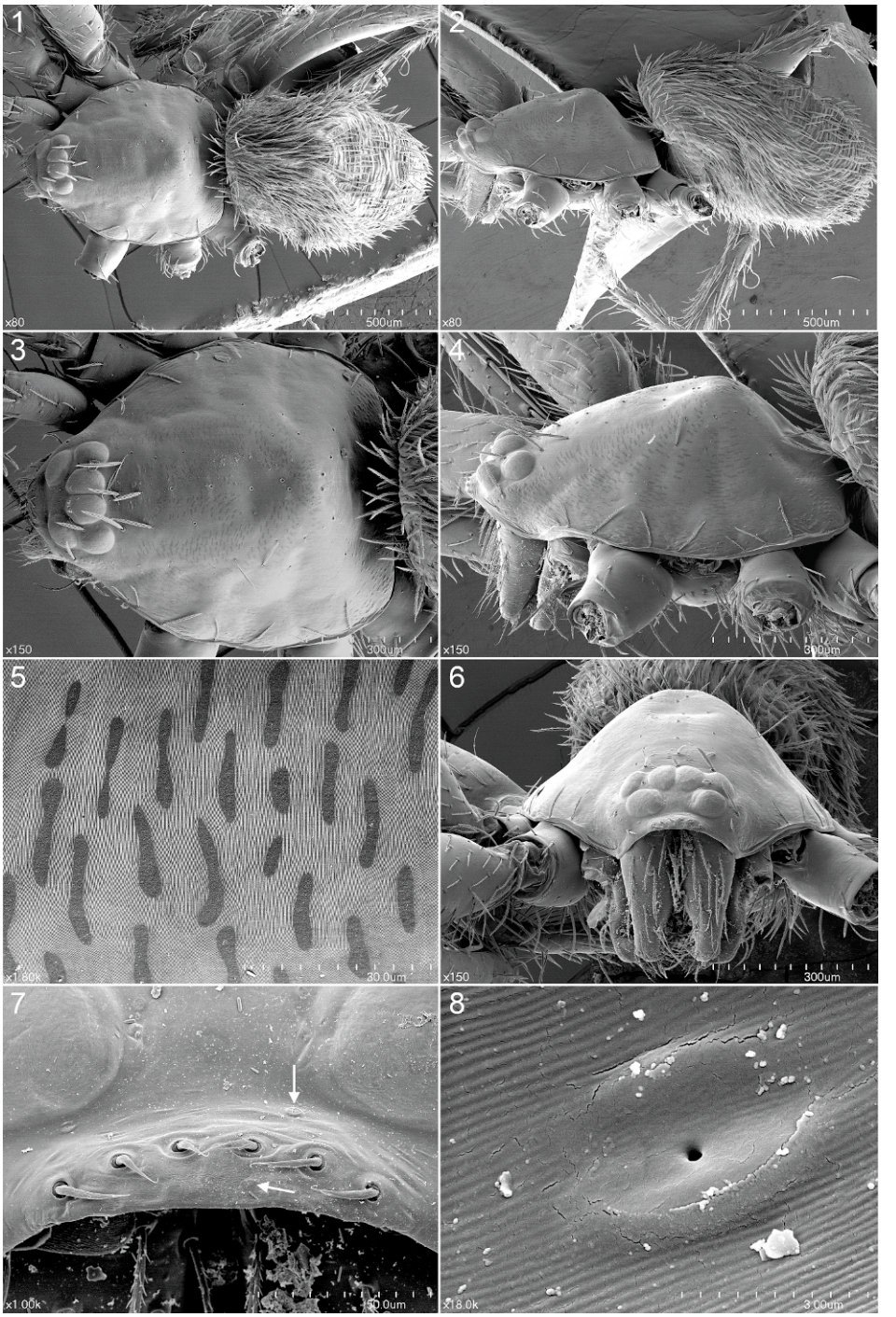
Oonops Templeton, 1835: 404 (type species by monotypy *Oonops pulcher* Templeton).

DIAGNOSIS: Our knowledge of soft-bodied oonopids is far too primitive, at this stage, to even guess what the actual limits of the type genus of the family may be. It is unlikely that even all the European species that have been assigned to the genus are actually congeneric with the type species; in particular, the synanthropic species *Oonops domesticus* Dalmas (1916) seems to have rather differently constructed genitalia and may be introduced into Europe from elsewhere. Because authors as recent as Chickering (1969) have expressed doubts about the separation of *Heteroonops* from *Oonops*, we present here a redescription of the type species of the latter genus. Both the elaborate embolus structure (figs. 33–40) and the bizarre opening on the endites of males (fig. 12, arrow), and the female genitalic conformation, with a bilobed posterior receptaculum (figs. 72–78), may help define the limits of the genus.

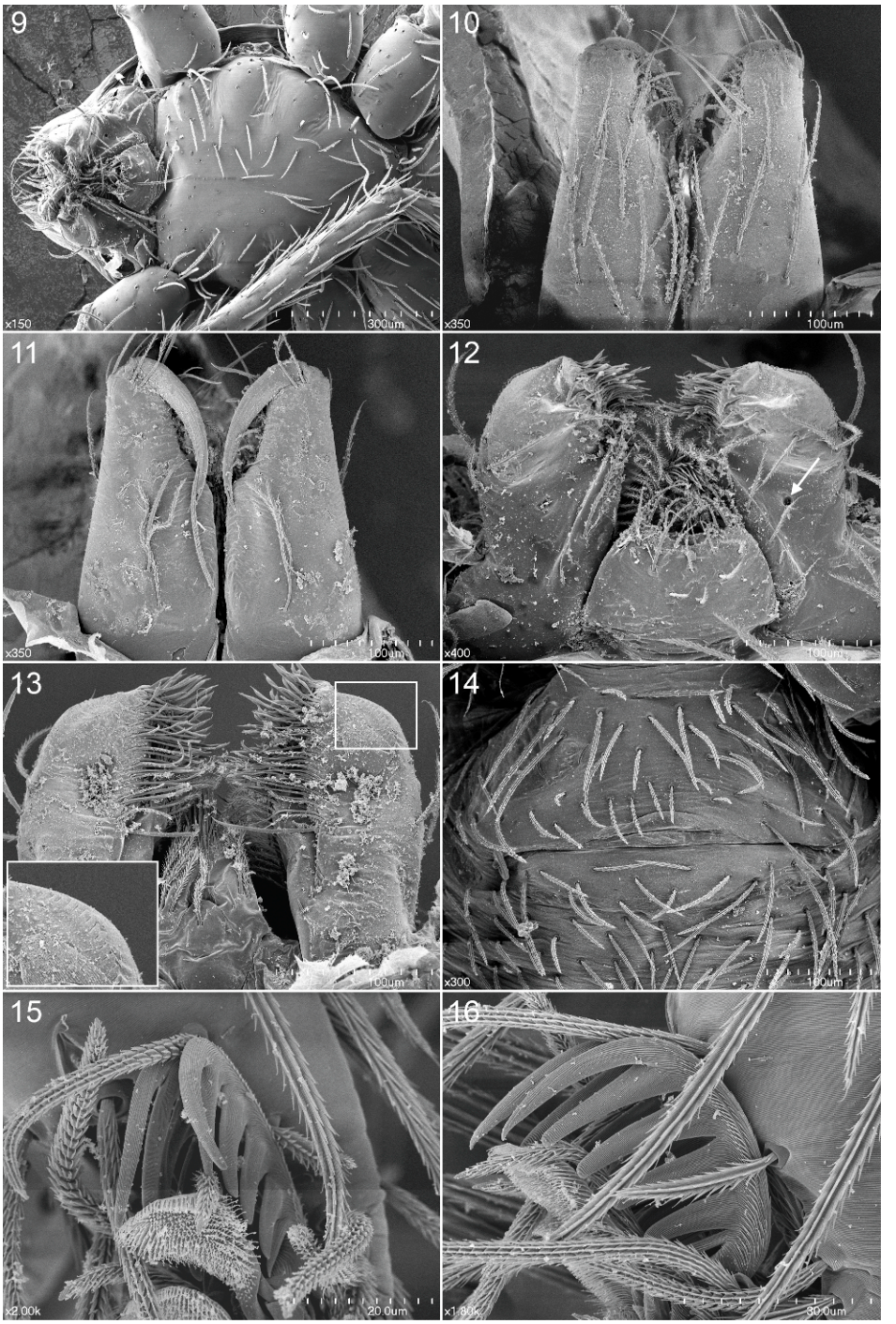
Oonops pulcher Templeton

Figures 1–78

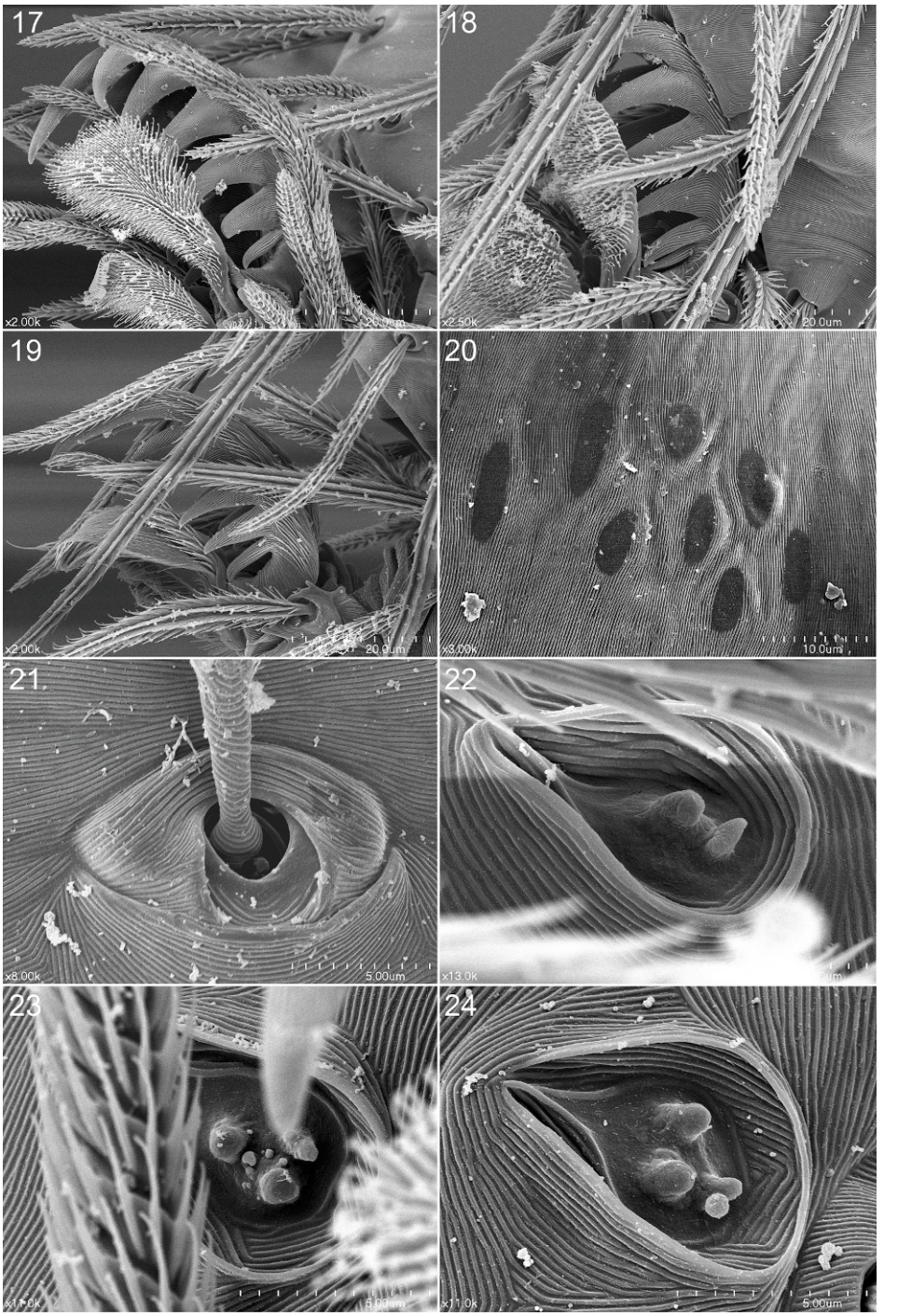
Oonops pulcher Templeton, 1835: 404, pl. 17, figs. 10–18 (male and female syntypes, presumably from Edinburg, Scotland, depository unknown). For subsequent references, see Platnick (2009).



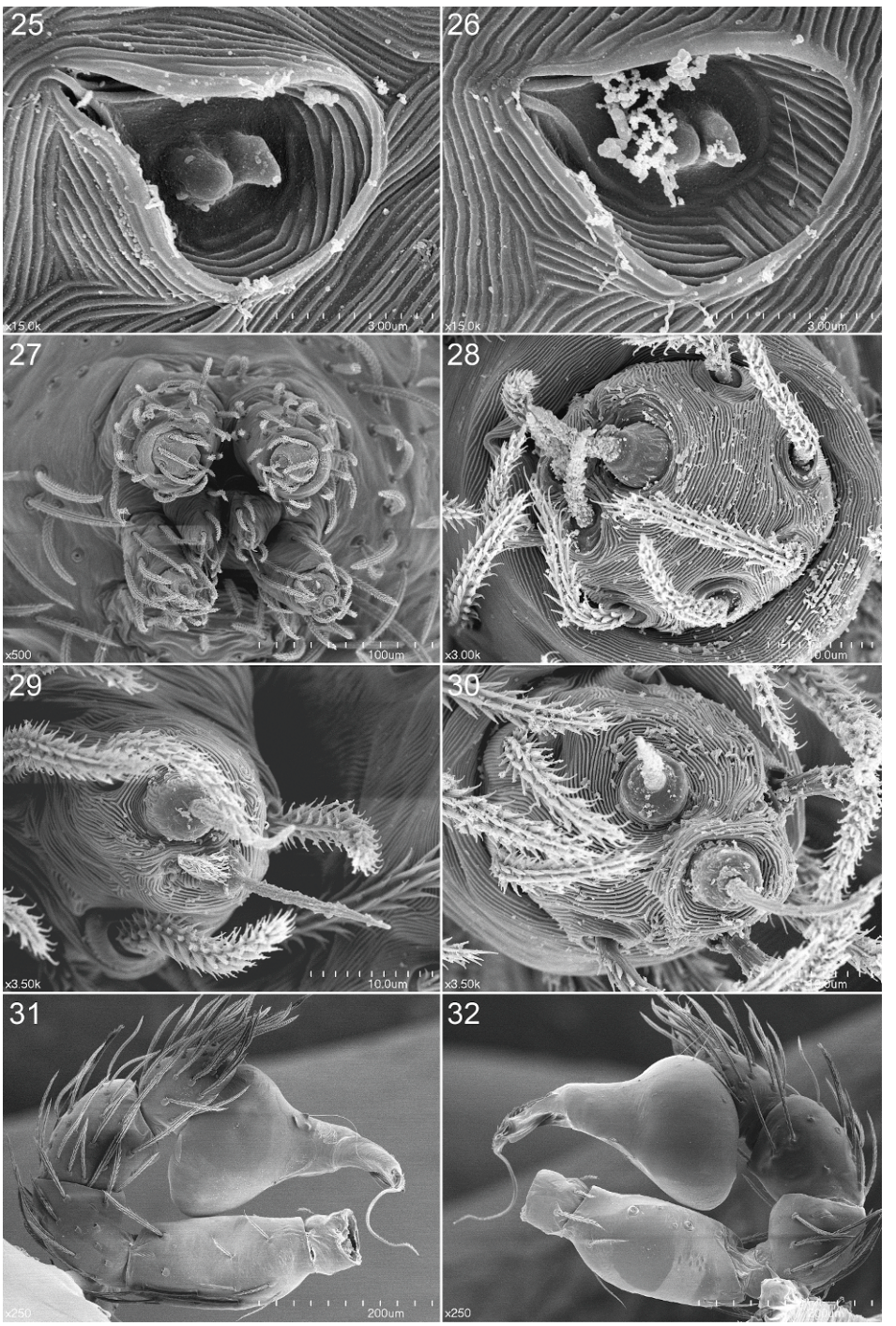
Figs. 1–8. *Oonops pulcher* Templeton, male. **1.** Habitus, dorsal view. **2.** Same, lateral view. **3.** Carapace, dorsal view. **4.** Same, lateral view. **5.** Carapace platelets, lateral view. **6.** Carapace, anterior view. **7.** Clypeus, anterior view (arrows point to depressions bearing pores). **8.** Clypeal pore, anterior view.



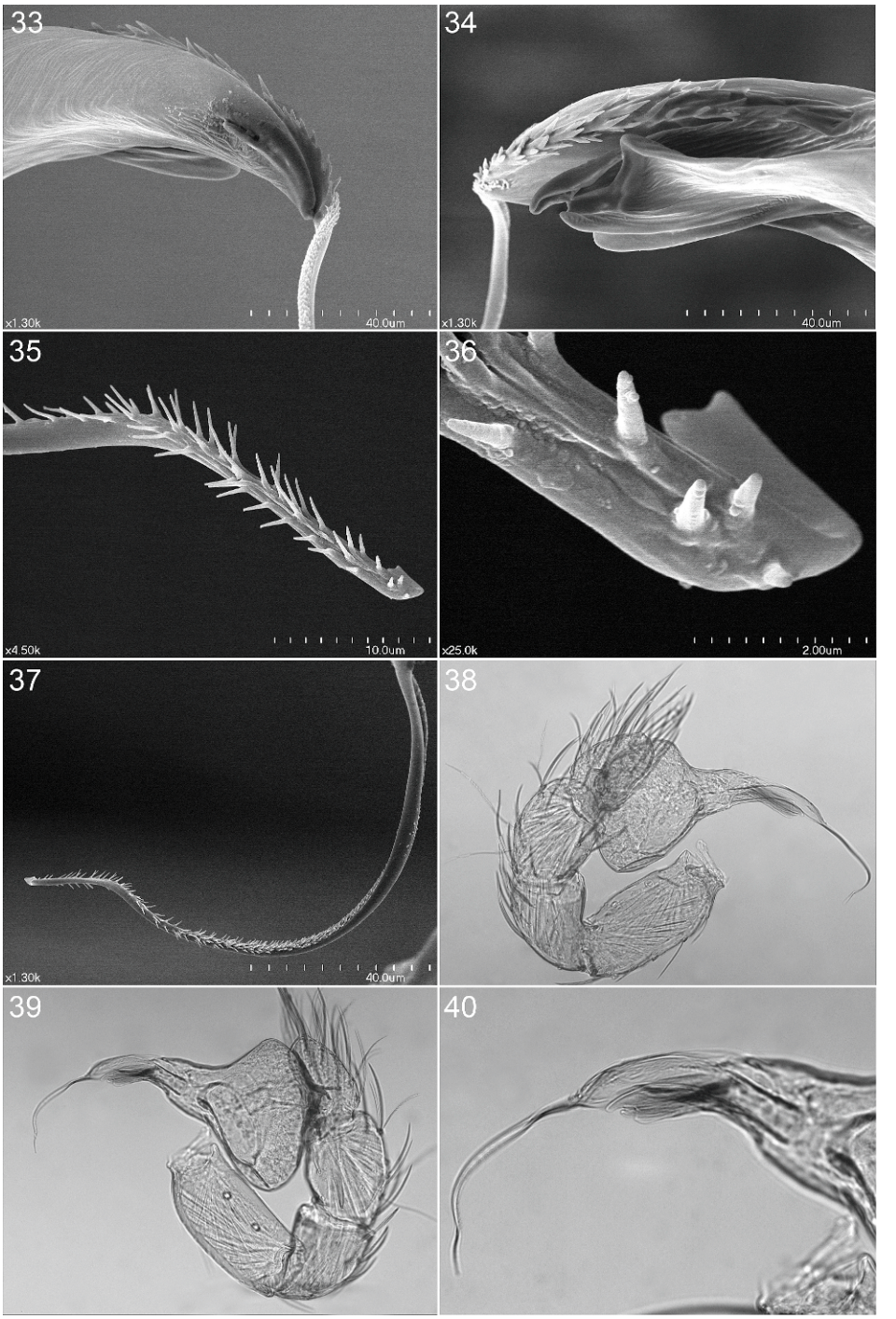
Figs. 9–16. *Oonops pulcher* Templeton, male. **9.** Cephalothorax, ventral view. **10.** Chelicerae, anterior view. **11.** Same, posterior view. **12.** Labium and endites, posterior view (arrow points to opening on endite). **13.** Labrum and endites, anterior view. **14.** Epigastric region, ventral view. **15.** Claws of leg I, distal view. **16.** Same, lateral view.



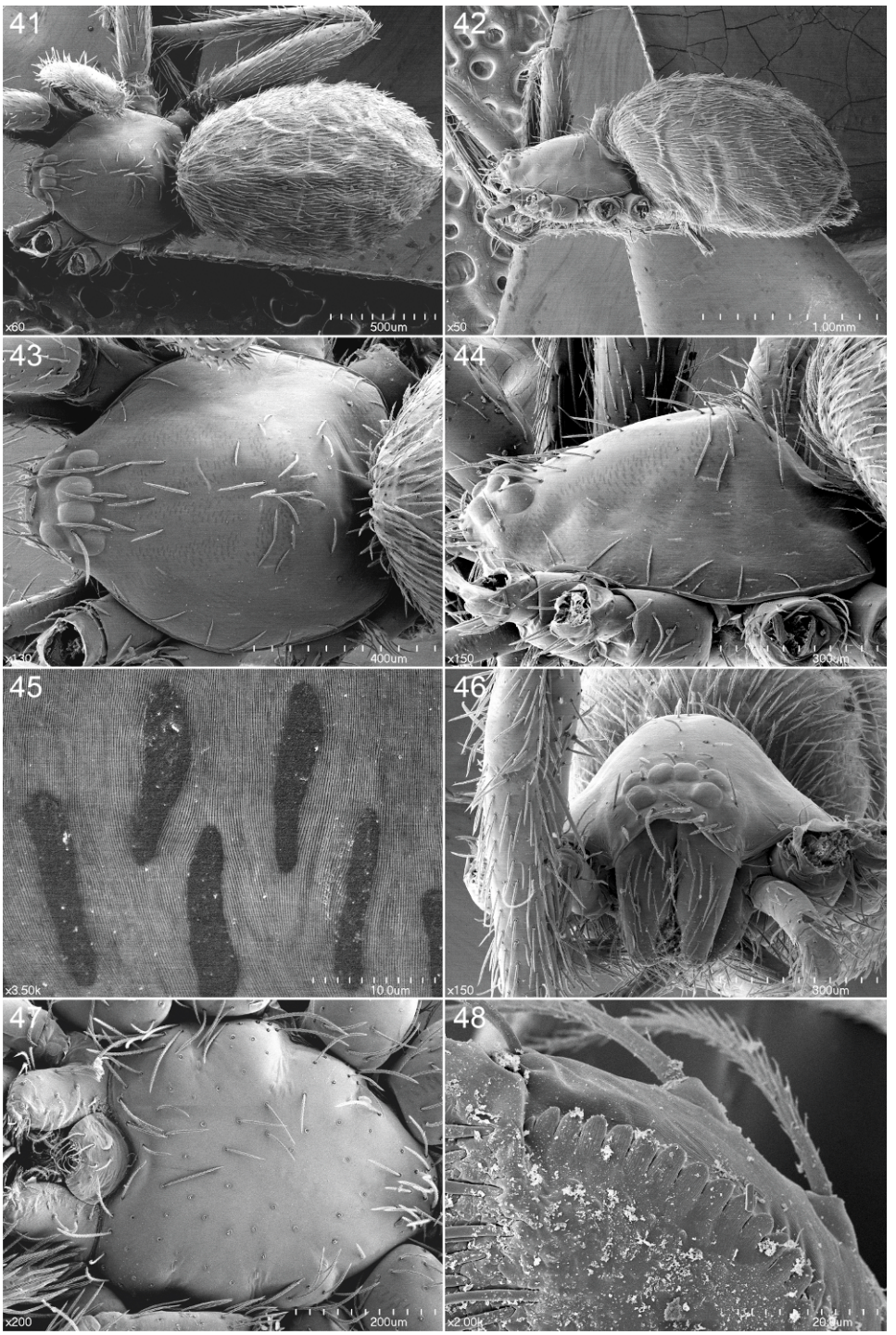
Figs. 17–24. *Oonops pulcher* Templeton, male. **17.** Claws of leg II, lateral view. **18.** Same, leg III. **19.** Same, leg IV. **20.** Platelets on palpal femur, retrolateral view. **21.** Trichobothrial base from metatarsus III, dorsal view. **22.** Tarsal organ from palp, dorsal view. **23.** Same, leg I. **24.** Same, leg II.



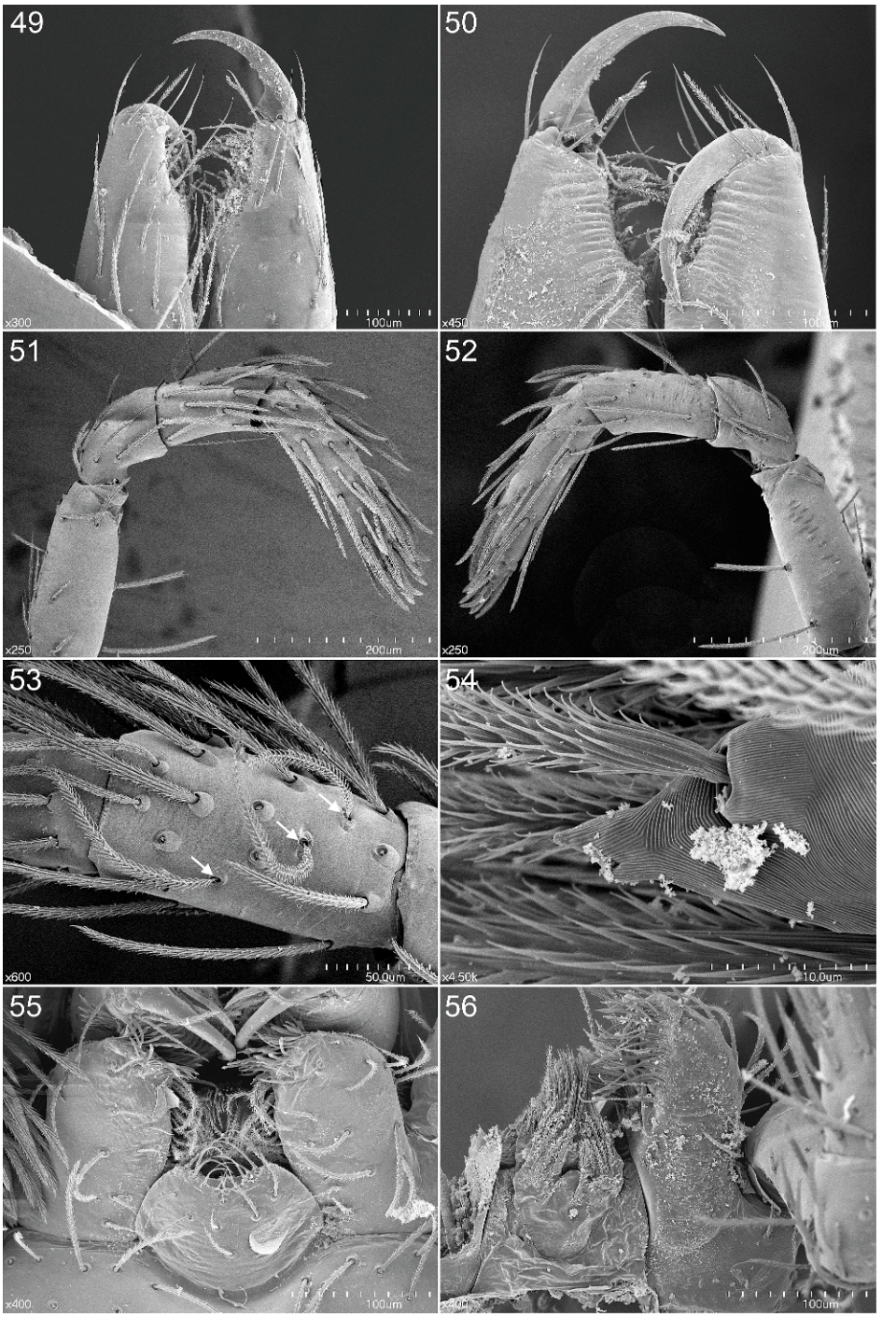
Figs. 25–32. *Oonops pulcher* Templeton, male. **25.** Tarsal organ from leg III, dorsal view. **26.** Same, leg IV. **27.** Spinnerets, posterior view. **28.** Same, anterior lateral spinneret. **29.** Same, posterior median spinneret. **30.** Same, posterior lateral spinneret. **31.** Palp, prolateral view. **32.** Same, retrolateral view.



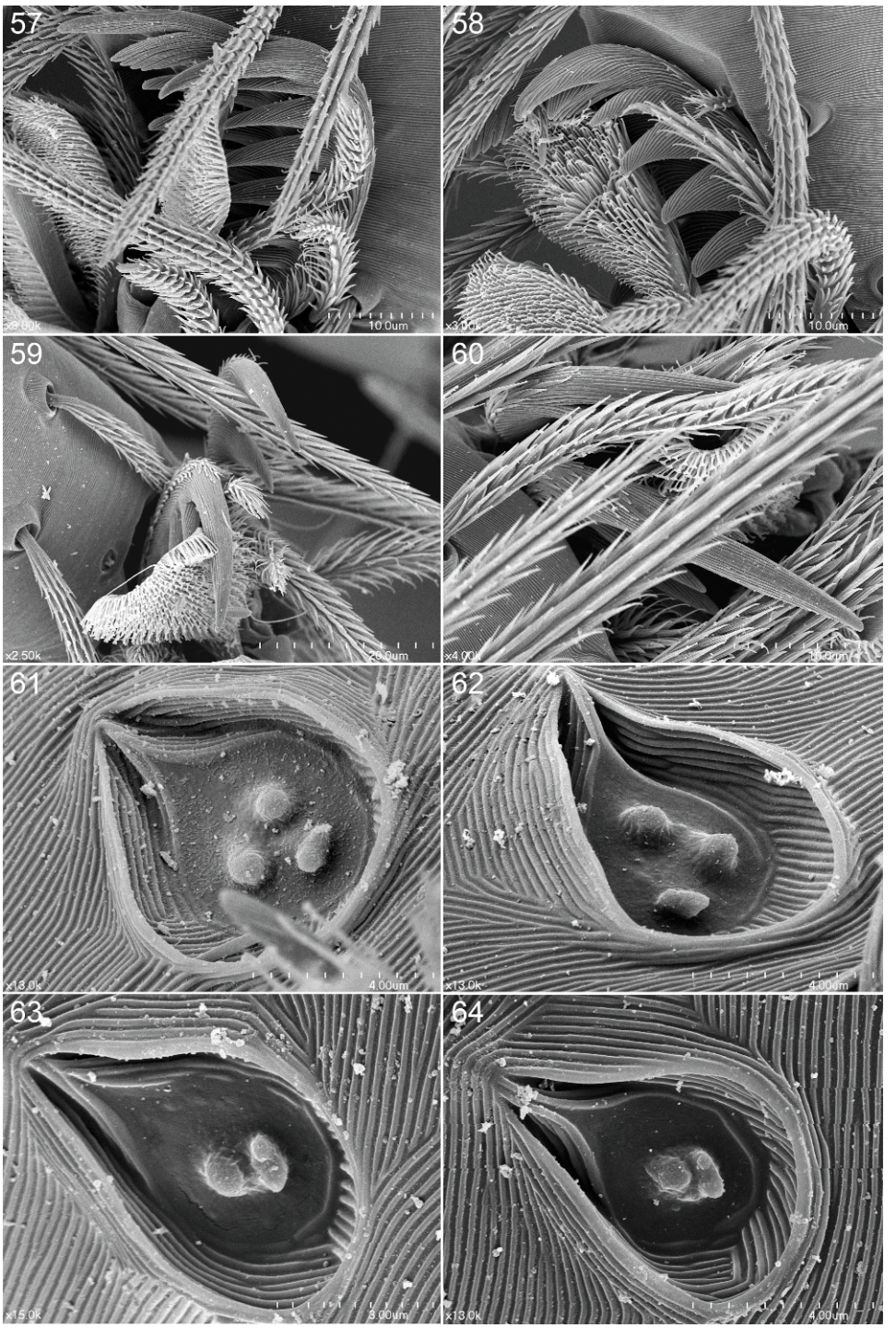
Figs. 33–40. *Oonops pulcher* Templeton, male. **33.** Conductor, prolateral view. **34.** Same, retrolateral view. **35.** Embolus, prolateral view. **36.** Same, tip. **37.** Same, retrolateral view. **38.** Compound microscope, palp, prolateral view. **39.** Same, retrolateral view. **40.** Same, conductor and embolus.



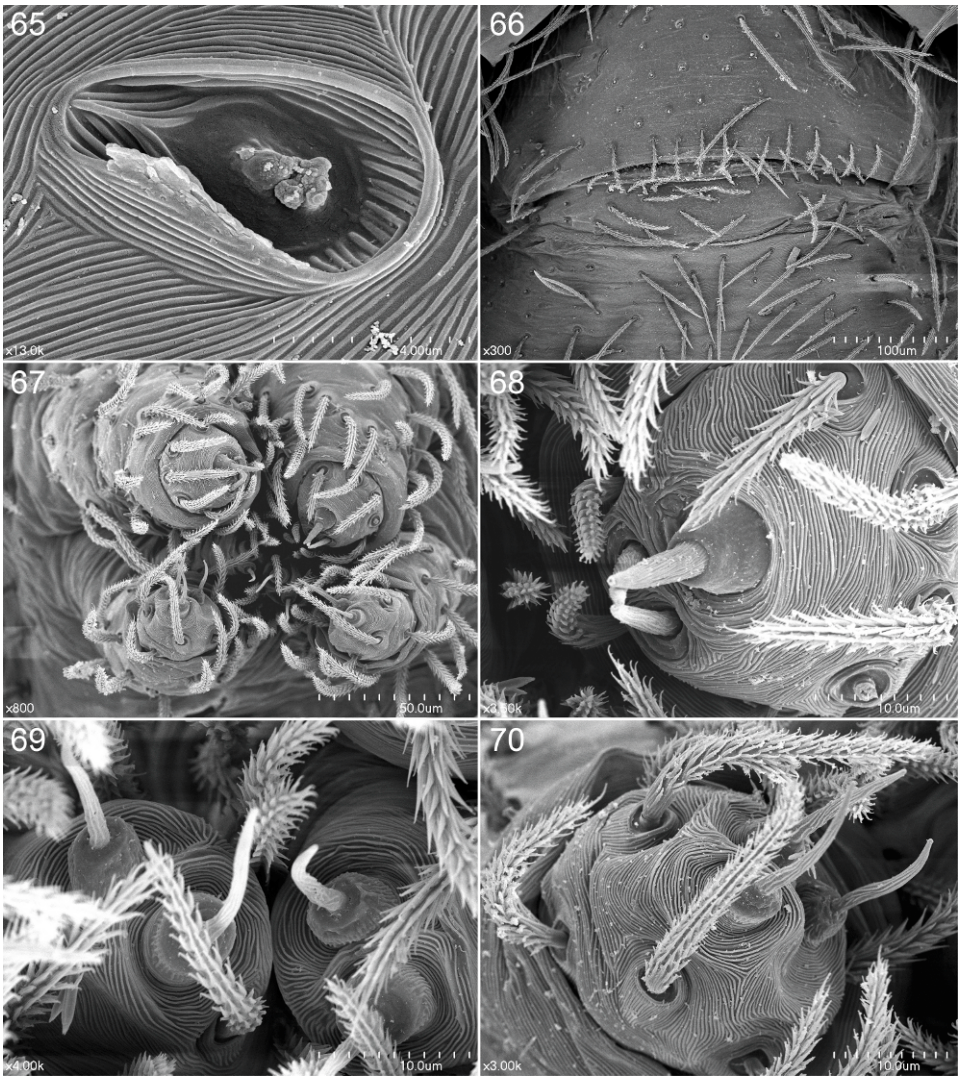
Figs. 41–48. *Oonops pulcher* Templeton, female. **41.** Habitus, dorsal view. **42.** Same, lateral view. **43.** Carapace, dorsal view. **44.** Same, lateral view. **45.** Carapace platelets, dorsal view. **46.** Carapace, anterior view. **47.** Cephalothorax, ventral view. **48.** Serrula, anterior view.



Figs. 49–56. *Oonops pulcher* Templeton, female. **49.** Chelicerae, anterior view. **50.** Same, posterior view. **51.** Palp, prolateral view. **52.** Same, retrolateral view. **53.** Palpal tibia, dorsal view (arrows point to trichobothrial bases). **54.** Tip of palpal tarsus, retrolateral view. **55.** Labium and endites, posterior view. **56.** Labrum and endites, anterior view.



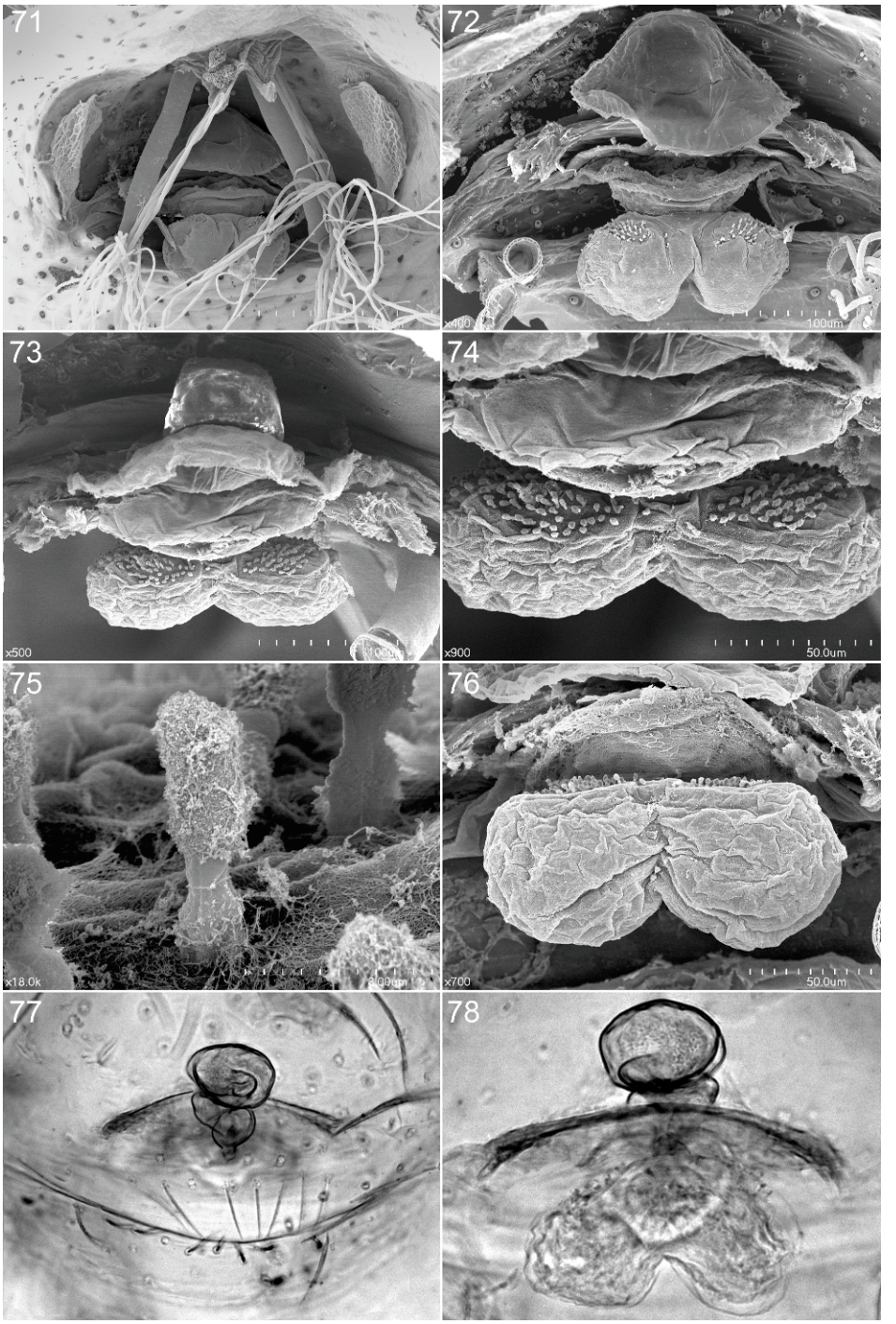
Figs. 57–64. *Oonops pulcher* Templeton, female. **57.** Claws of leg I, lateral view. **58.** Same, leg II. **59.** Same, leg III. **60.** Same, dorsal view. **61.** Tarsal organ from leg I, dorsal view. **62.** Same, leg II. **63.** Same, leg III. **64.** Same, leg IV.



Figs. 65–70. *Oonops pulcher* Templeton, female. **65.** Tarsal organ from palp, dorsal view. **66.** Epigastric region, ventral view. **67.** Spinnerets, posterior view. **68.** Same, anterior lateral spinneret. **69.** Same, posterior median spinnerets. **70.** Same, posterior lateral spinneret.

DIAGNOSIS: The form of the embolus (figs. 31–40) and female genitalia (figs. 72–78) are presumably diagnostic.

MALE (PBI_OON 36410): Total length 1.72 (habitus, figs. 1, 2). **Cephalothorax:** Carapace yellow, without pattern, ovoid in dorsal view (fig. 3), pars cephalica strongly elevated in lateral view (fig. 4), anteriorly narrowed to between 0.5 and 0.75 times its maximum width, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, sides smooth, thorax without depressions, fovea absent, with rows of platelets (fig. 5), without radiating rows of pits, lateral margin straight, rebordered, without denticles; plumose setae near posterior



Figs. 71–78. *Oonops pulcher* Templeton, female. **71.** Respiratory system, dorsal view. **72.** Internal female genitalia, dorsal view. **73.** Same, anterior view. **74.** Pore field of posterior receptaculum, anterior view. **75.** Same, presumed secretory gland. **76.** Posterior receptaculum, posterior view. **77.** Compound microscope, female genitalia, ventral view. **78.** Same, dorsal view.

margin of pars thoracica absent; nonmarginal pars cephalica and pars thoracica setae dark, plumose, marginal setae absent. Clypeus margin unmodified, curved downwards in front view (fig. 6), sloping forward in lateral view, high, ALE separated from edge of carapace by their radius or more, median projection absent, with two pairs of oval depressions bearing pores (fig. 8), one pair situated below six thickened, dark, needlelike setae, one pair situated above that setal row (fig. 7, arrow). Chilum absent. Eyes six, well developed, ALE largest, ALE oval, PME squared, PLE oval; posterior eye row recurved from above, straight from front; ALE separated by their radius to diameter, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum longer than wide (fig. 9), yellowish white, uniform, not fused to carapace, median concavity absent, with radial furrows between coxae I–II, II–III, III–IV, furrow striated, radial furrow opposite coxae III absent, surface smooth, without pits, microsculpture absent, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae approximately equal, extensions of precoxal triangles present, lateral margins unmodified, without posterior hump; setae sparse, dark, plumose, evenly scattered, originating from surface, without hair tufts. Chelicerae, endites, and labium yellow; chelicerae straight (figs. 10, 11), anterior face unmodified, without teeth on promargin or retromargin, without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae dark, plumose, evenly scattered; paturon inner margin with scattered setae, distal region unmodified, posterior surface unmodified, promargin unmodified, inner margin unmodified, laminate groove absent. Labium triangular (fig. 12), not fused to sternum, anterior margin indented at middle, same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally excavated, same as sternum in sclerotization, serrula present in single row (fig. 13), anteromedian tip unmodified, posteromedian part unmodified, conspicuous, large pore present on ventral surface (fig. 12). **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, without rows of small sclerotized platelets; dorsum white, without color pattern; book lung covers large, ovoid, without setae, anterolateral edge unmodified; posterior spiracles connected by groove (fig. 14); pedicel tube short, unmodified, scuto-pedicel region unmodified, abdomen extending anteriad of pedicel, plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent; dorsal, epigastric, postepigastric, and spinneret scuta absent; dorsum and venter with many dark, plumose setae; dense patch of setae anterior to spinnerets absent. Colulus absent. Spinnerets: ALS with one major ampullate gland spigot and two piriform gland spigots; PMS with two spigots; PLS with two spigots (figs. 27–30). **Legs:** yellow, without color pattern; femur IV not thickened, same size as femora I–III, patella plus tibia I nearly as long as carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula absent, metatarsi I and II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent, coxae with rows of platelets ventrally. Leg spination (all spines longer than segment width): femora I–IV d1-0-1; tibiae: I, II v2-4-2; III p1-0-1, v0-1-2, r0-0-1; IV v0-1-2, r0-0-1; metatarsi: I, II v2-0-2; III v0-1-2, r0-1-1; IV p1-0-1, v0-1-2. Tarsi I to IV superior claws with inner face striate; on all tarsi both claws with five teeth on lateral surface, none on median surface, inferior claw lacking (figs. 15–19). Tibiae each with three trichobothria, metatarsi each with one; base rounded, aperture internal texture not gratelike, hood covered by numerous low, closely spaced ridges (fig. 21). Tarsal organs of legs I, II with three sensillae, of legs III, IV with two sensillae (figs. 23–26). **Genitalia:** Epigastric region with sperm pore not visible; furrow without Ω-shaped insertions, without setae; palp of normal size, not strongly sclerotized, right and left palps symmetrical (figs. 31, 32, 38, 39), proximal segments yellow; embolus long, dark, prolateral excavation absent, distal half spiny; trochanter of normal size, unmod-

ified; femur of normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally, retrolateral surface with platelets (fig. 20); patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria; tarsal organ with two sensillae (fig. 22); cymbium yellow, ovoid in dorsal view, not fused with bulb, not extending beyond distal tip of bulb, plumose setae absent, without stout setae, without distal patch of setae; bulb yellow, more than 2 times as long as cymbium, stout, tapering apically; conductor curved (figs. 33, 34, 40); embolus long, spiny (figs. 35–37).

FEMALE (PBI_OON 36414): Total length 1.74. As in male except as noted (see figs. 41–78). Clypeus setae plumose (fig. 46). Endites without ventral opening (fig. 55). Female palp without claw (fig. 54), without spines; tarsus unmodified (fig. 51), patella without prolateral row of ridges, femur and tibia with retrolateral rows of platelets (fig. 52); tibia with three trichobothria (fig. 53); tarsal organ with two sensillae (fig. 65). Epigastric and postepigastric scuta present, weakly sclerotized, yellow, postepigastric scutum short, only around epigastric furrow, not fused to epigastric scutum, anterior margin unmodified (fig. 66), without posteriorly directed lateral apodemes. PLS with three spigots (fig. 70). Leg spination as in males except tibiae: III d0-1-0, p1-0-1, v0-1-2, r0-0-1; IV d0-1-0, p1-0-1, v0-1-2, r1-0-1. Tarsi I both claws with six teeth on lateral surface, five teeth on median surface; tarsus II each claw with four teeth on lateral surface, five teeth on median surface (figs. 57–60). Booklungs apparently with single leaf, posterior spiracles leading to pair of large tracheae extending into cephalothorax, with numerous abdominal trachaeoles branching off at base (fig. 71). Anterior receptaculum large, spherical; posterior receptaculum large, bilobed, with two pore fields bearing short glands (figs. 72–78).

MATERIAL EXAMINED: UNITED KINGDOM: **England:** *Derbyshire:* Chatsworth House Park, Apr. 11, 1987 (M. Roberts, AMNH PBI_OON 37527), 2♀. *Oxfordshire:* Wytham Woods, Aug. 30, 1953 (AMNH PBI_OON 1749), 1♀. *Yorkshire:* Sheffield, Ecclesall Woods, May 9, 1987 (M. Roberts, AMNH PBI_OON 36414), 1♀. **Scotland:** *Chirnside:* Scottish Borders, 5 mi N border with England, 9 mi inland from Berwick-upon-Tweed, Sept. 1999 (M. Roberts, AMNH PBI_OON 36412), 1♂, 2♀; Scottish Borders, Violet Bank, Sept. 30–Oct. 3, 2008 (M. Roberts, AMNH PBI_OON 36411), 1♂, 1♀; Edinburg, Polwart Gardens, Oct. 5, 2008 (M. Roberts, AMNH PBI_OON 36410), 1♂, 5♀. **Wales:** *Denbighshire:* Cilygroeslwyd Wood, near Ruthin, Aug. 20, 1972 (M. Roberts, AMNH PBI_OON 37526), 1♂. *Gwynedd:* Llanrug, South Bank of River Seint, Aug. 25, 1973 (M. Roberts, AMNH PBI_OON 36413), 1♂, 2♀. *Isle of Anglesey:* Gogarth Reserve, May 16, 1973 (M. Roberts, AMNH PBI_OON 37525), 1♂.

DISTRIBUTION: The full distribution of the species remains to be established, but it has reportedly been introduced into areas outside Europe, such as Tasmania (Hickman, 1979).

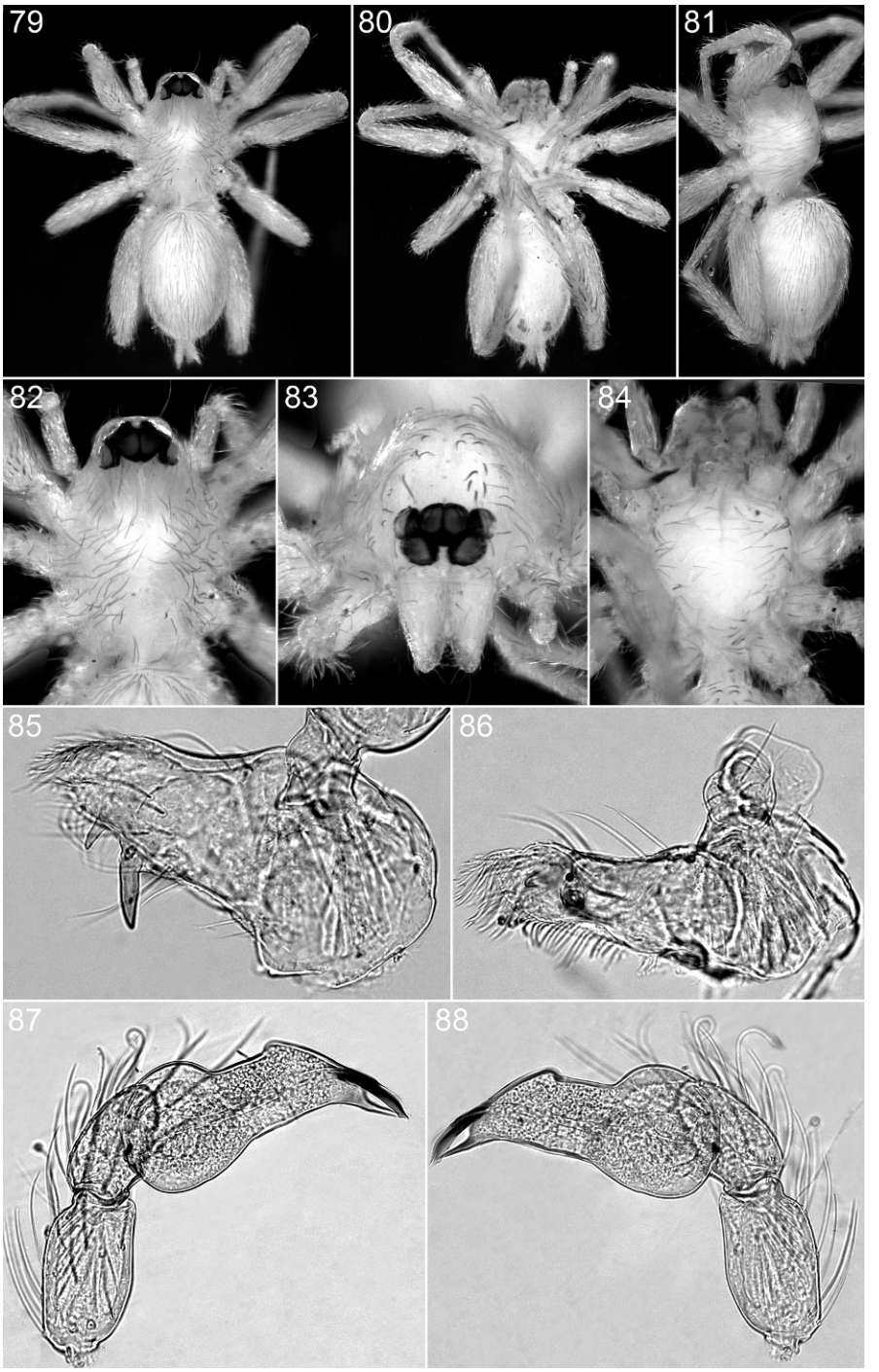
NATURAL HISTORY: Templeton (1835) reported that these spiders overwinter in cocoons in ivy, and Michael Roberts (in litt.) has confirmed that they are frequently taken in ivy, often in close company with the cribellate spider *Amaurobius similis* (Blackwall).

Heteroonops Dalmas

Heteroonops Dalmas, 1916: 203 (type species by monotypy *Oonops spinimanus* Simon).

Matyotia Saaristo, 2001: 349 (type species by original designation *Matyotia tetraspinosus* Saaristo). NEW SYNONYMY.

DIAGNOSIS: Males can be recognized by the backward-pointing projection situated anteriorly on the palpal endites (figs. 272, 273); some males have a second projection situated posteriorly of the first (figs. 154, 155), and that second projection can sometimes be enlarged (figs. 85, 86). Females can be recognized by their elongated, highly spinose pedipalps, which have spines on the femora, patellae, tibiae, and tarsi (figs. 108, 109); the palpal patellae are sometimes laterally dilated (fig. 112) or elongated (fig. 320) as well. At least one other soft-bodied oonopid has a large posterior projection on the male endites (*Oonops tolucanus* Gertsch and Davis, 1942, from Mexico), but in that species the anterior



Figs. 79–88. *Heteroonops spinimanus* (Simon), male. **79.** Habitus, dorsal view. **80.** Same, ventral view. **81.** Same, lateral view. **82.** Carapace, dorsal view. **83.** Same, anterior view. **84.** Cephalothorax, ventral view. **85.** Endite, retrolateral view. **86.** Same, ventral view. **87.** Palp, prolateral view. **88.** Same, retrolateral view.

projection appears to be lacking, the legs are spineless, and the female palp (assuming the sexes were correctly matched by Gertsch and Davis) is normal in size and spineless.

RELATIONSHIPS: At this point, existing knowledge of the diversity of soft-bodied oonopids is far too primitive to allow thorough testing of hypotheses about the relationships of *Heteroonops*, but there are at least two groups of species that may (singly or together) contain or constitute its sister group. Both groups include species from the Lesser Antilles but probably also occur in Panama and/or northern South America; unfortunately each group is currently represented by very few specimens.

One group of species occurs in Puerto Rico and through the Lesser Antilles at least to Trinidad. The male palps have a spiniform conductor, the male endites have an anterior projection that is anteriorly or ventrally (not posteriorly) directed, and females have the posterior receptacula much more extensively developed than in *Heteroonops*. Among the described species that may belong to this group are *Oonops viridans* Bryant (1942) and *Oonops ebenecus* Chickering (1972) from Puerto Rico, *Oonops trapellus* Chickering (1970) from Trinidad, and *Oonops donaldi* Chickering (1951) from Panama.

In the second group of species, the projections on the male endites are more hook shaped and are accompanied posteriorly by an excavation, and females again have more extensively developed posterior genitalic elements. In this group, however, the male palp lacks a conductor and the embolus is widened. The described species that may belong to this group include *Oonops ronoxus* Chickering (1971) from the Virgin Islands, *Oonops aristelus* Chickering (1972) from Antigua, and *Oonops sicorius* Chickering (1970) from Curaçao.

At least until the relationships of these Caribbean taxa, those currently assigned to *Oonopoides* Bryant (1940), and their potential relatives in northern South America can be clarified, it seems best to restrict *Heteroonops* to the set of species that seem, on the basis of their posteriorly directed male endite projections and their elongated, spinose female pedipalps, to be the closest relatives of *H. spinimanus*.

DESCRIPTION: Total length of males 1.3–1.8, of females 1.4–2.0. **Cephalothorax:** Carapace yellow, without any pattern, ovoid in dorsal view (figs. 98, 100, 269, 312), pars cephalica slightly elevated in lateral view (figs. 99, 101), except in *H. castellus* males, where strongly elevated (fig. 270), anteriorly narrowed to 0.49 times its maximum width or less, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth (but at least in females of *H. spinimanus* with rows of platelets, figs. 100, 102), sides smooth, thorax without depressions, fovea absent, without radiating rows of pits, lateral margin straight, smooth, without denticles; plumose setae near posterior margin of pars thoracica absent; nonmarginal pars cephalica and pars thoracica setae dark, plumose; marginal setae dark, plumose. Clypeus margin unmodified, curved downward in front view, vertical in lateral view, high, ALE separated from edge of carapace by their radius or more, median projection absent; setae present, dark, plumose. Chilum absent. Eyes six, well developed, ALE largest, ALE oval, PME squared, PLE oval; posterior eye row recurved from above, procurved from front; ALE separated by their radius to diameter, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum longer than wide (figs. 103, 271, 313), yellowish white, uniform, not fused to carapace, median concavity absent, with radial furrows between coxae I–II, II–III, III–IV, furrow smooth, radial furrow opposite coxae III absent, surface smooth, without pits, microsculpture absent, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae II and III greater than distance between coxae I and II, and coxae III and IV, extensions of precoxal triangles present, lateral margins unmodified, without posterior hump; setae abundant, dark, plumose, evenly scattered, originating

from surface, without hair tufts. Chelicerae, endites, and labium yellowish white; chelicerae straight, anterior face unmodified, without teeth on promargin or retromargin, without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified, median half of posterior surface sometimes with low denticles; setae dark, needlelike, evenly scattered; paturon inner margin with scattered setae, distal region unmodified, posterior surface unmodified, promargin unmodified, inner margin unmodified, laminate groove absent (figs. 106, 107, 275, 276, 314, 315). Labium triangular, not fused to sternum, anterior margin indented at middle, same as sternum in sclerotization, with six or more setae on anterior margin, subdistal portion with unmodified setae (figs. 104, 316). Labrum with flattened median lobe (figs. 105, 274, 317). Endites distally not excavated, same as sternum in sclerotization, anteromedian part with backward-pointing projection in males (figs. 272, 273), posteromedian part sometimes with second backward-pointing projection as well; endites scanned only in *H. castellus*, female *H. spinimanus*, and male *H. vega*, females usually with serrula consisting of single row of teeth (figs. 105, 318, 319), but serrula lost in males of at least *H. castellus* and *H. vega* (and possibly other males, except *H. murphyorum*, fig. 154). Female palp without claw (figs. 113, 323, 325); strong spines present on femora, patellae, tibiae, and tarsi (figs. 108, 109, 111, 120, 320–322); femur with retrolateral row of platelets; patella without prolateral row of ridges, often elongated or prolaterally dilated (fig. 112), sometimes with prolateral platelets (fig. 326); tibia with dorsal row of platelets (at least in *H. spinimanus*, fig. 110) and three trichobothria; tarsus unmodified; tarsal organ with two sensillae (figs. 121, 324). **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, without rows of small sclerotized platelets; dorsum white, without color pattern; book lung covers large, ovoid, without setae, anterolateral edge unmodified; posterior spiracles connected by groove (fig. 348), leading to large tracheae penetrating cephalothorax, with numerous abdominal tracheoles (fig. 132), anterior spiracles leading to booklungs with two leaves (at least in female *H. spinimanus*, fig. 133); pedicel tube short, unmodified, scuto-pedicel region unmodified, abdomen extending anteriad of pedicel; plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent; dorsum and venter with dark, plumose setae; dense patch of setae anterior to spinnerets absent; males lacking scuta; females with weak epigastric and postepigastric scuta, epigastric scutum yellow, not surrounding pedicel, not protruding, small lateral sclerites absent, without lateral joints, postepigastric scutum yellow, short, only around epigastric furrow, not fused to epigastric scutum, anterior margin unmodified, without posteriorly directed lateral apodemes. Colulus represented only by setae; spinnerets scanned only in *H. castellus* and female *H. spinimanus*, but each with more spigots than in female *Oonops pulcher* (figs. 126, 278, 328): ALS with major ampullate gland spigot and two or three piriform gland spigots (figs. 127, 279, 329), PMS with 2–7 aciniform gland spigots (figs. 128, 280, 330), PLS with 2–17 aciniform gland spigots (figs. 129, 281, 331). **Legs:** yellow, without color pattern; femur IV not thickened, same size as femora I–III, patella plus tibia I near as long as carapace, tibia I unmodified, tibiae with Emerit's glands in at least some species (figs. 332, 343, arrow), patellae and tibiae sometimes also with differently shaped platelets without pores (figs. 333, 342), tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula absent, metatarsi I and II mesoapical comb absent, metatarsi III and IV weak ventral scopula absent; legs with spines on femora (usually), tibiae, and metatarsi, all spines longer than segment width (fig. 344); claw and sensory structures scanned only in *H. castellus* and female *H. spinimanus*, where tarsal proclaws and retroclaws have inner face striate, males apparently have teeth only on lateral surface, females have additional distal teeth on median surface (figs. 115–119, 283–286, 334–337); inferior claws absent; tibiae each with three trichobothria, metatarsi with one distal or subdistal trichobothrium (figs. 114, 345, 346), base longitudinally narrowed, aperture internal texture gratelike, hood covered by numerous low, closely spaced

ridges (figs. 282, 327); tarsal organ of legs I, II with three sensillae, of legs III and IV with two sensillae (figs. 122–125, 287–290, 338–341, 347). **Genitalia:** Male epigastric region with sperm pore not visible (fig. 277); furrow without Ω-shaped insertions, without setae; palp of normal size (figs. 291, 292), not strongly sclerotized, right and left palps symmetrical, proximal segments yellow; embolus dark, prolateral excavation absent; trochanter of normal size, unmodified; femur of normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria (fig. 296) and (at least in *H. castellus*) pore-bearing platelets (fig. 297); tarsal organ with two sensillae (fig. 298); cymbium yellow, narrow in dorsal view, not fused with bulb, not extending beyond distal tip of bulb, plumose setae absent, without stout setae, without distal patch of setae; bulb white, 1 to 1.5 times as long as cymbium, stout, elongated; short conductor present (figs. 293–295). Females with longitudinal anterior receptaculum, often widened anteriorly, forming T-shaped structure, at least sometimes with associated long secretory glands (figs. 349–353); V-shaped elements of anterior portion apparently fitting into similarly shaped posterior structures when epigastric furrow is closed, moving apart when epigastric furrow is opened (figs. 96, 130, 131); posterior receptaculum well developed, at least sometimes with pore field and associated glands.

SYNONYMY: The generic synonymy reflects our placement of the type species of *Matyotia* as the male of the type species of *Heteroonops*.

KEY TO SPECIES
(except *H. colombi* from Cuba)

1. Females (unknown in *H. iviei*, *H. toro*, and *H. macaque*) 2
– Males (unknown in *H. singulus*, *H. andros*, and *H. spinigata*) 12
2. Palpal patella prolaterally dilated (as in fig. 112) 3
– Palpal patella not prolaterally dilated 6
3. Epigastric scutum triangular, well separated from postepigastric scutum (fig. 166); anterior receptaculum T-shaped, with thin transverse bar (figs. 167, 168). . . *H. murphyorum*
– Epigastric scutum rectangular, close to postepigastric scutum; anterior receptaculum otherwise 4
4. Anterior receptaculum large and round, posterior receptaculum triangular (figs. 96, 97) . . . . . *H. spinimanus*
– Receptacula otherwise. 5
5. Anterior receptaculum trumpet shaped (figs. 146, 147). . . . . *H. singulus*
– Anterior receptaculum umbrella shaped (figs. 174, 175). . . . . *H. andros*
6. Epigastric and postepigastric scuta strongly sclerotized (figs. 239, 379). 7
– Epigastric scutum and postepigastric scutum not strongly sclerotized 8
7. Epigastric scutum longer than wide (fig. 379); anterior receptaculum diamond shaped (figs. 380, 381). . . . . *H. croix*
– Epigastric scutum wider than long (fig. 239); anterior receptaculum long, gradually expanding anteriorly (figs. 240, 241) *H. validus*
8. Posterior receptaculum relatively small (figs. 210, 258). 9
– Posterior receptaculum relatively large (figs. 183, 306, 400) 10
9. Anterior receptaculum elongated, bearing branches (figs. 258, 259). . . . *H. castelloides*
– Anterior receptaculum T-shaped, narrow throughout its length, without branches (figs. 210, 211). . . . . *H. vega*
10. Anterior receptaculum small and rounded, posterior receptaculum heart shaped (figs. 183, 184). . . . . *H. spinigata*
– Receptacula otherwise. 11
11. Anterior receptaculum tack shaped, posterior receptaculum rectangular (figs. 399, 400) . . . . . *H. saba*
– Anterior receptaculum terminating in knob shaped, dorsally directed expansion, posterior receptaculum triangular (figs. 306, 307) . . . . . *H. castellus*
12. Anteromedian part of each endite with two spines pointing backward (figs. 85, 154). 13
– Anteromedian part of each endite with one spine pointing backward. 14
13. Anteromedian part of endites with basal spine slightly larger than apical one (fig. 154); embolus curved, only distal half darkened (figs. 156–158). . . . . *H. murphyorum*
– Anteromedian part of endites with basal spine much larger than the apical one (figs. 84, 85); embolus rather straight, proximal half darkened (figs. 87, 88) . . . . . *H. spinimanus*

14. Endites with small (as wide as long), pointed spine (figs. 228, 265, 370) 15
– Endites with large (longer than wide), curving spine (as in figs. 191, 218) 17
15. Bulb constricted apically, conductor large, narrowing greatly near tip (figs. 371, 372) . . . . . *H. croix*
– Bulb not constricted apically, conductor slender, tapering apically 16
16. Embolus curved at base, conductor short, twisted (figs. 267, 268) . . . . . *H. castellus*
– Embolus strongly bent at base, conductor long, straight (figs. 230–232) . . . . . *H. validus*
17. Base of embolus enlarged (as in figs. 221, 249) 18
– Base of embolus not enlarged 19
18. Conductor narrow, spiniform (figs. 249, 250) . . . . . *H. castelloides*
– Conductor large, triangular (figs. 220, 221) . . . . . *H. iviei*
19. Embolus long, conductor large, lamelliform (figs. 193–196) . . . . . *H. vega*
– Embolus short, conductor narrow, spiniform 20
20. Apex of bulb rounded, not extending far beyond base of embolus (figs. 362–364). . . . . *H. toro*
– Apex of bulb pointed, extending well beyond base of embolus 21
21. Apex of bulb prolonged, conductor long (figs. 390, 391). . . . . *H. saba*
– Apex of bulb not prolonged, conductor short (figs. 409, 410). . . . . *H. macaque*

Heteroonops spinimanus (Simon)

Figures 79–139

Oonops spinimanus Simon, 1891: 563, pl. 42, fig. 6 (female syntype from St. Vincent, in Natural History Museum, London, not examined; five female syntypes from Caracas, Distrito Federal, Venezuela, in MNHN; examined).

Oonops bermudensis Banks, 1902: 269, fig. 1a–c (female holotype from the Bermuda Islands, no specific locality, in PMY; examined). First synonymized by Sierwald, 1988: 10.

Heteroonops spinimanus: Dalmas, 1916: 203. – Chickering, 1969: 154, fig. 28–32; 1973: 227, figs. 1–4. – Benoit, 1977: 33, figs. 12a–c. – Dumitresco and Georgesco, 1983: 88, pl. 13, figs. 1–5 (identification uncertain). – Saaristo, 2001: 351, figs. 170–174.

Oonopinus hunus Suman, 1965: 238, figs. 35–37 (female holotype from SE slope of Ulumawao Peak, Kailua, Oahu, Hawaii, in BPBM; examined). NEW SYNONYMY.

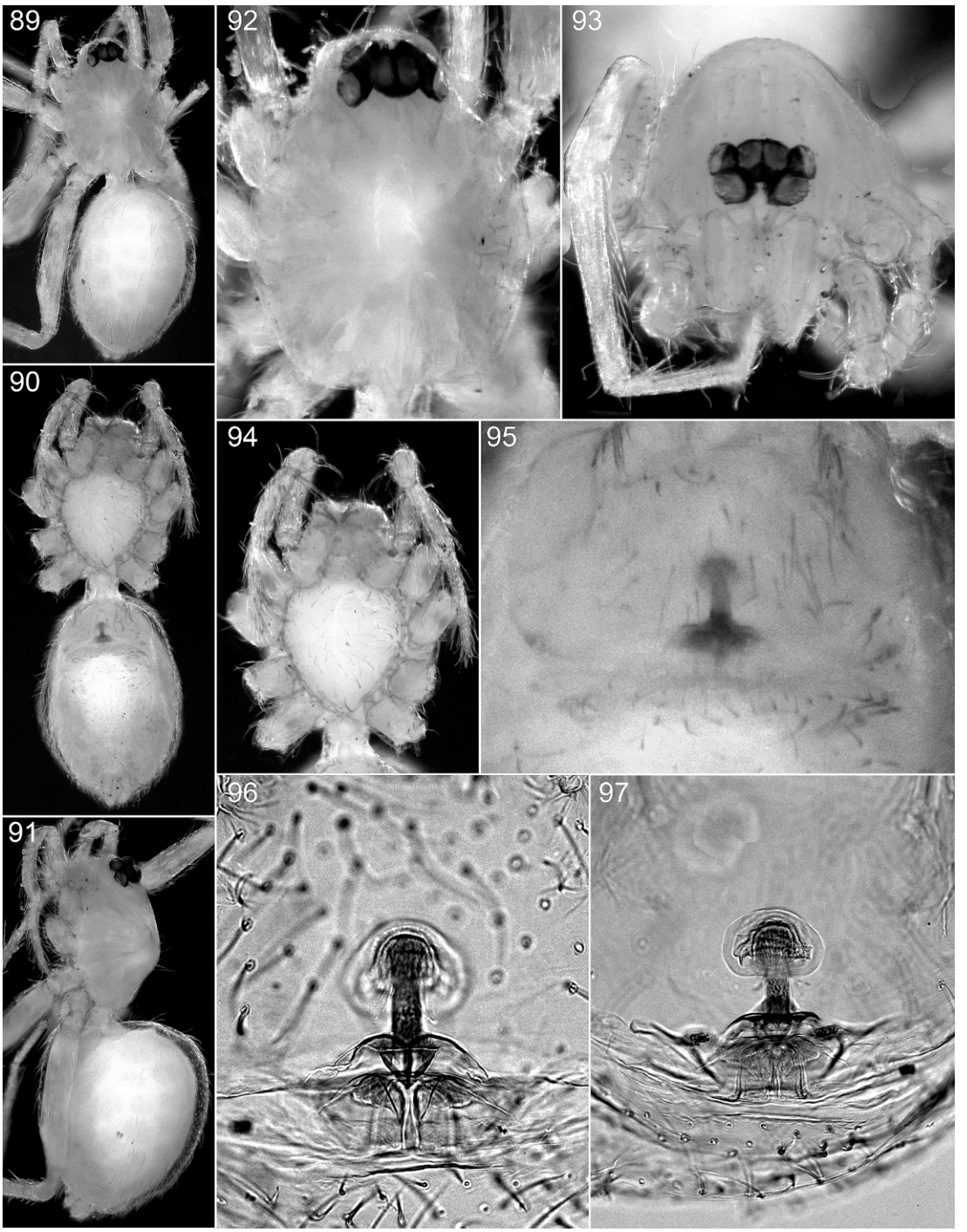
Matyotia tetraspinosus Saaristo, 2001: 351, figs. 165–169 (male holotype from Anse Cimitière, Silhouette, Seychelle Islands, in ZMUT; examined). NEW SYNONYMY.

DIAGNOSIS: Males can easily be recognized by the enlarged posterior projection on the palpal endites (figs. 84–86) and the angular embolus and conductor (figs. 87, 88), females by the umbrella-shaped anterior receptaculum (fig. 95) bearing posterior long glands (figs. 135, 136).

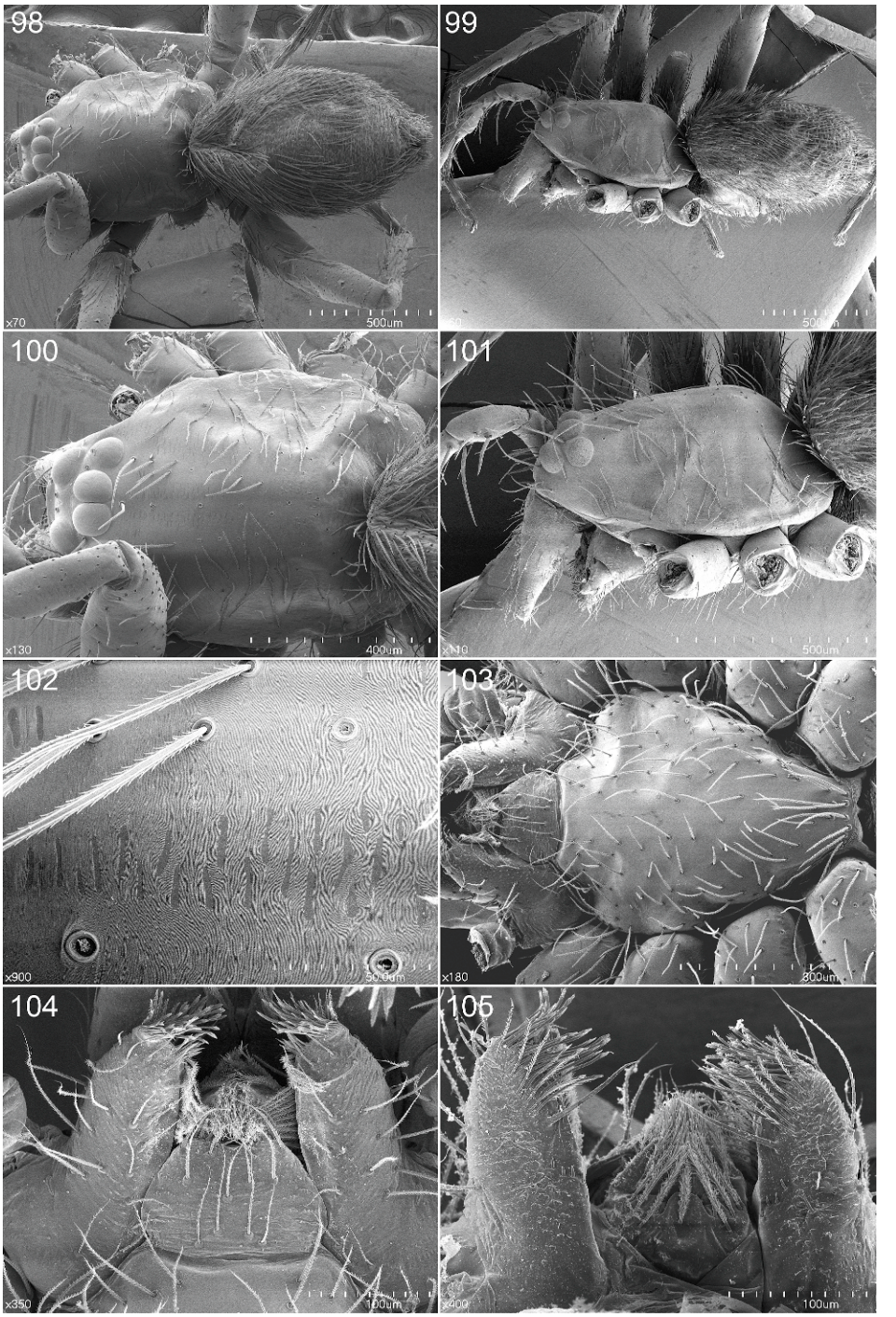
MALE (PBI_OON 37347, figs. 79–83): Total length 1.64. Endites each with two posteriorly directed projections, posterior one enlarged (figs. 84–86). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I, II d1-0-1; III d0-1-1; IV d1-0-0; tibiae: I, II v0-0-1; III d0-1-0, p0-0-1, r0-0-1; IV d0-1-0, p0-1-1, v0-0-2, r0-1-1; metatarsi: I, II v0-0-1; III d1-0-0, v1-2-0, r1-1-0; IV d1-0-0, p1-1-0, v1-0-2, r1-1-0. Basal portion of palpal bulb rotund, distal portion flattened, embolus and conductor beak shaped (figs. 87, 88).

FEMALE (PBI_OON 37956, figs. 89–94): Total length 1.83. Palpal patella prolaterally dilated at half its length. Leg spination: femora: I, II d1-0-0; III d0-1-1; IV d1-0-0; tibiae: I v0-2-0; III p0-1-0, v1-2-0, r0-1-0; IV d1-0-0, p1-0-1, v0-1-1, r0-0-1; metatarsi: I v2-2-0; II v2-1-0; III d1-0-0, v1-2-0, r1-1-0; IV d1-0-0, p1-1-0, v0-1-2, r1-0-1. Palpal spination: femur v0-1-1, patella p0-1-1, tibia p1-1-1, v1-1-0, tarsus p2-3-0, v2-1-4. Anterior receptaculum large, spherical, with long glands; posterior receptaculum triangular, with short glands, situated between two lateral apodemes (figs. 95–97, 134–139).

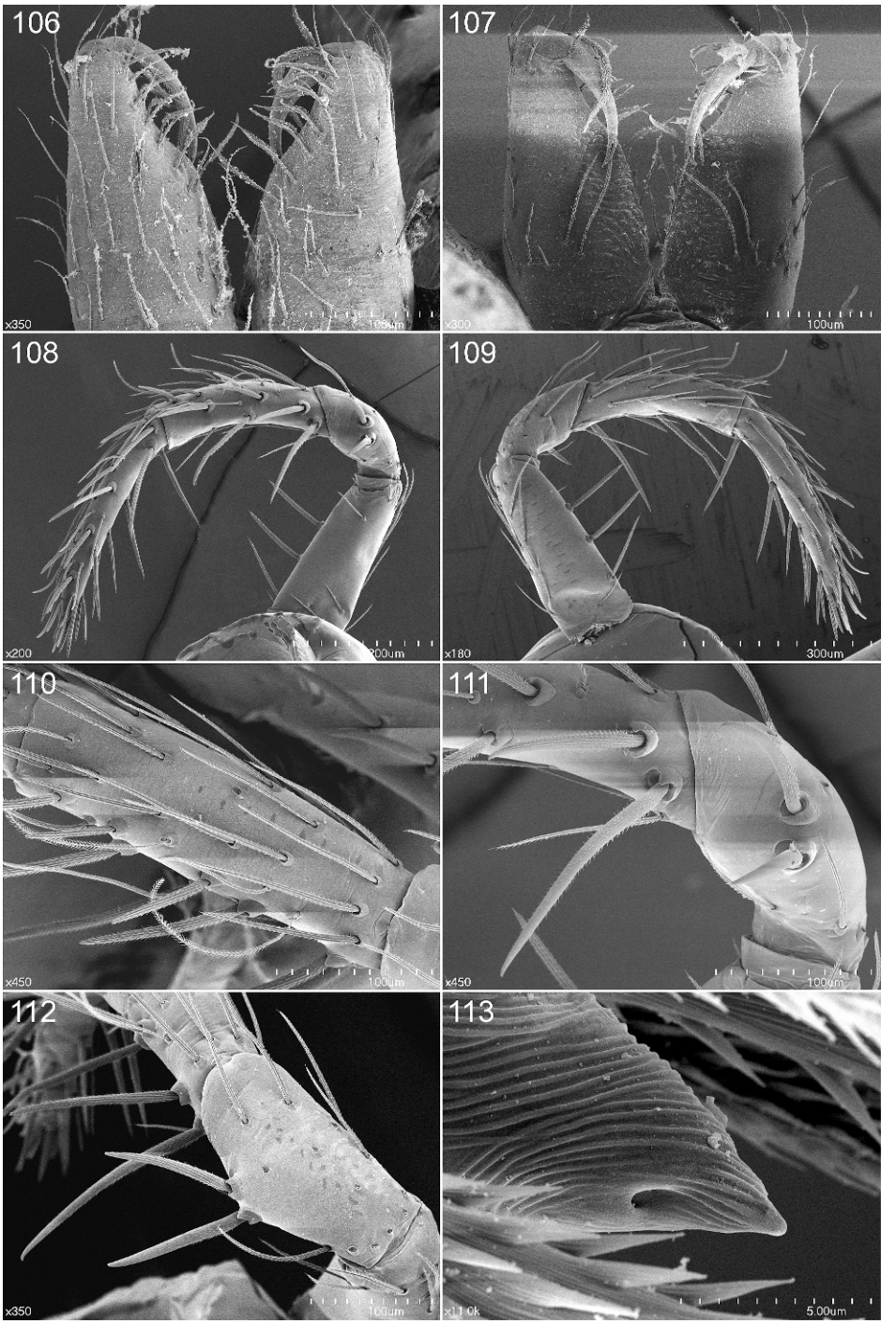
MATERIAL EXAMINED: UNITED STATES: **Florida:** *Alachua Co.:* no specific locality, Mar. 30, 1934 (H. Wallace, AMNH PBI_OON 21166), 2♀; 118 Drive and 13th Ave., South Pointe, Gainesville, Sept. 16, 2007 (X. Wang, AMNH PBI_OON 31065), 1♀; Gainesville, Mar. 8, 1927 (W. Barrows, AMNH PBI_OON 26744), 1♀, Feb. 10, 1942 (W. Ivie, AMNH PBI_OON 26741), 5♀, Feb. 1–14, 1979, pitfall, oak-pine (E. Becker, CNC PBI_OON 38134), 2♀; Newman's Lake, Gainesville, June 13, 1935 (W. Ivie, W. Gertsch, AMNH PBI_OON 1098, 21176), 6♀; San Felasco State Park, Gainesville, Sept. 24, 2007, in leaf litter (X. Wang, AMNH PBI_OON 31069), 2♀ (one used for DNA sequencing). *Collier*



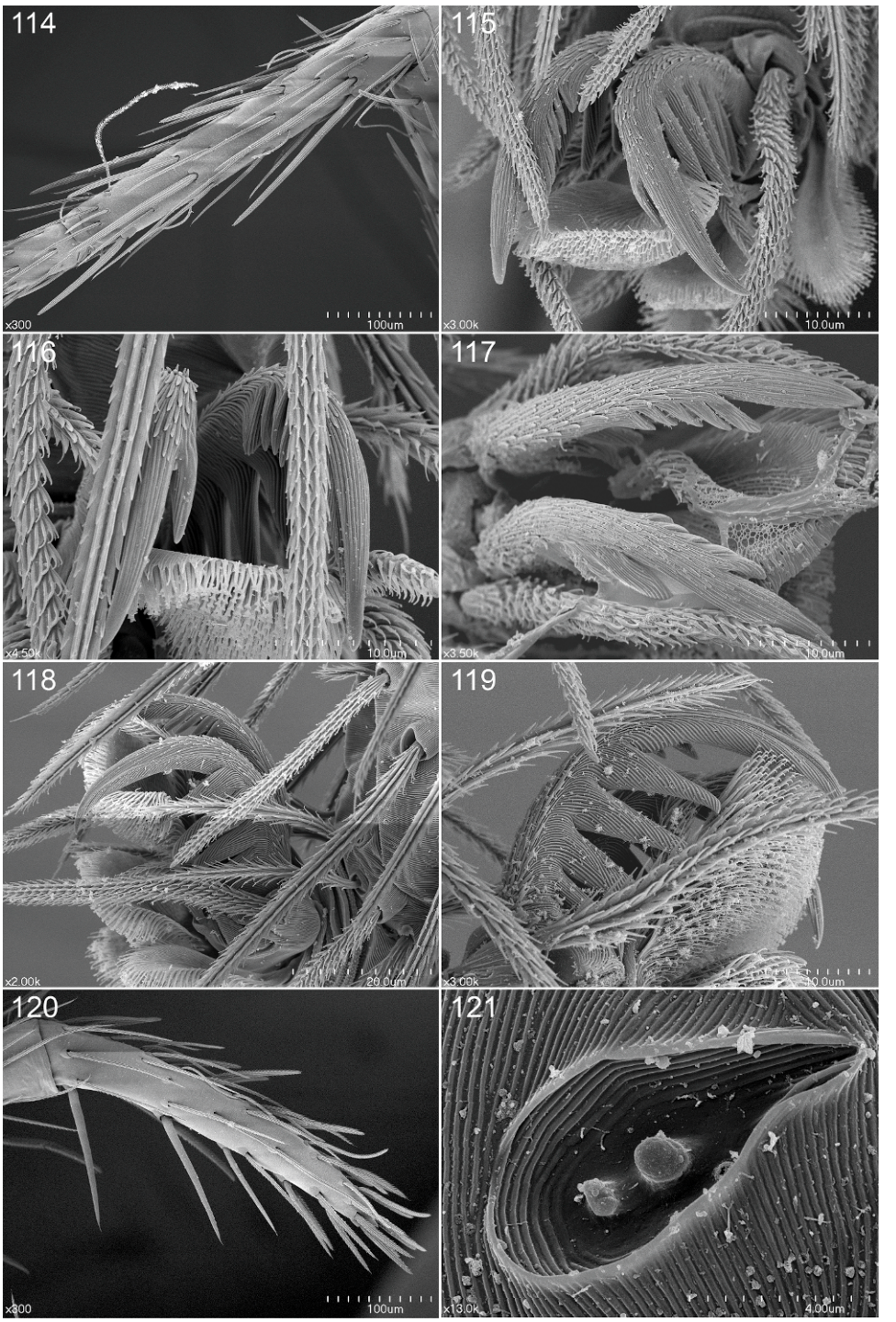
Figs. 89–97. *Heteroonops spinimanus* (Simon), female. **89.** Habitus, dorsal view. **90.** Same, ventral view. **91.** Same, lateral view. **92.** Carapace, dorsal view. **93.** Same, anterior view. **94.** Cephalothorax, ventral view. **95.** Epigastric area, ventral view. **96.** Female genitalia, ventral view. **97.** Same, dorsal view.



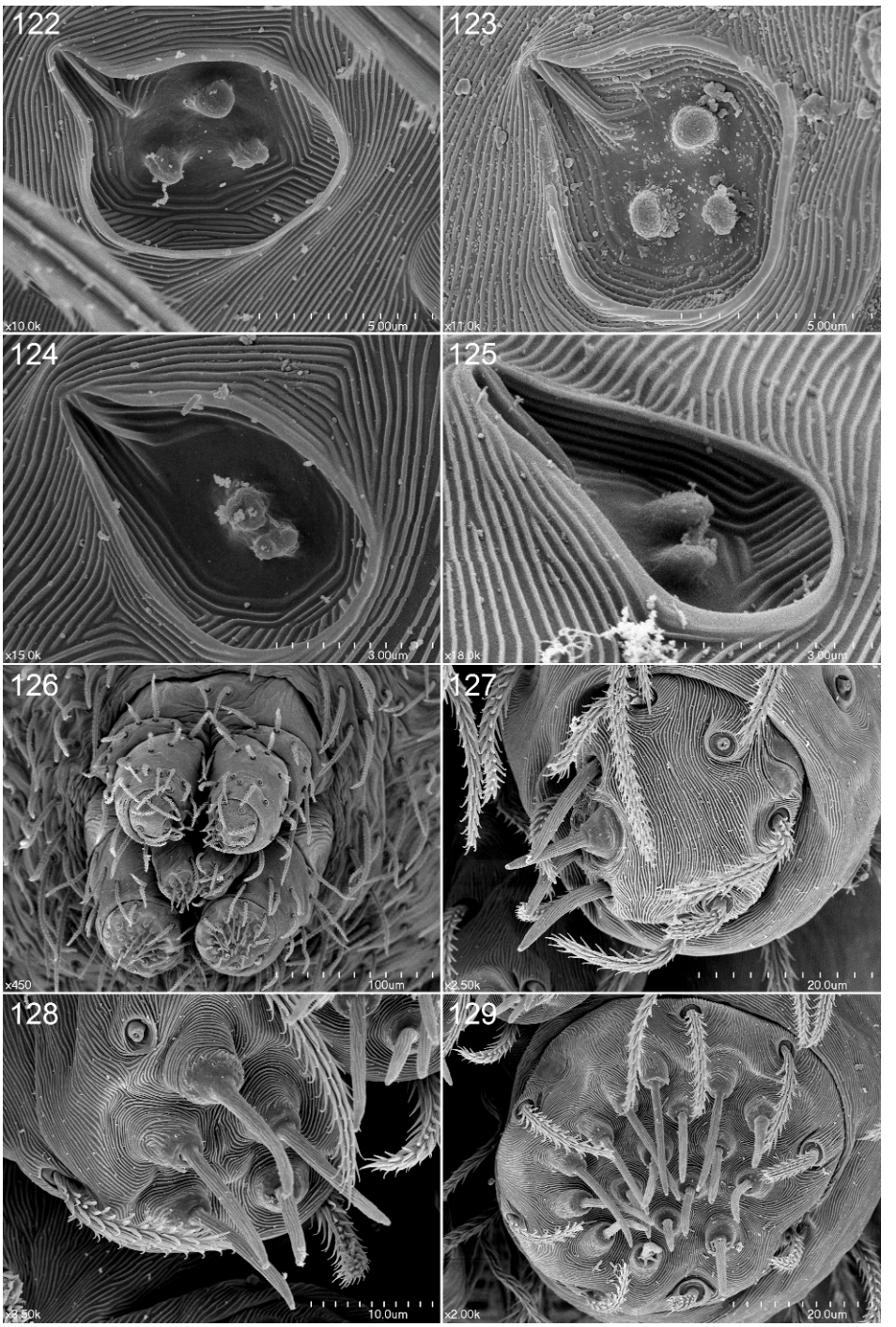
Figs. 98–105. *Heteroonops spinimanus* (Simon), female. **98.** Habitus, dorsal view. **99.** Same, lateral view. **100.** Carapace, dorsal view. **101.** Same, lateral view. **102.** Carapace platelets, dorsal view. **103.** Cephalothorax, ventral view. **104.** Labium and endites, posterior view. **105.** Labrum and endites, anterior view.



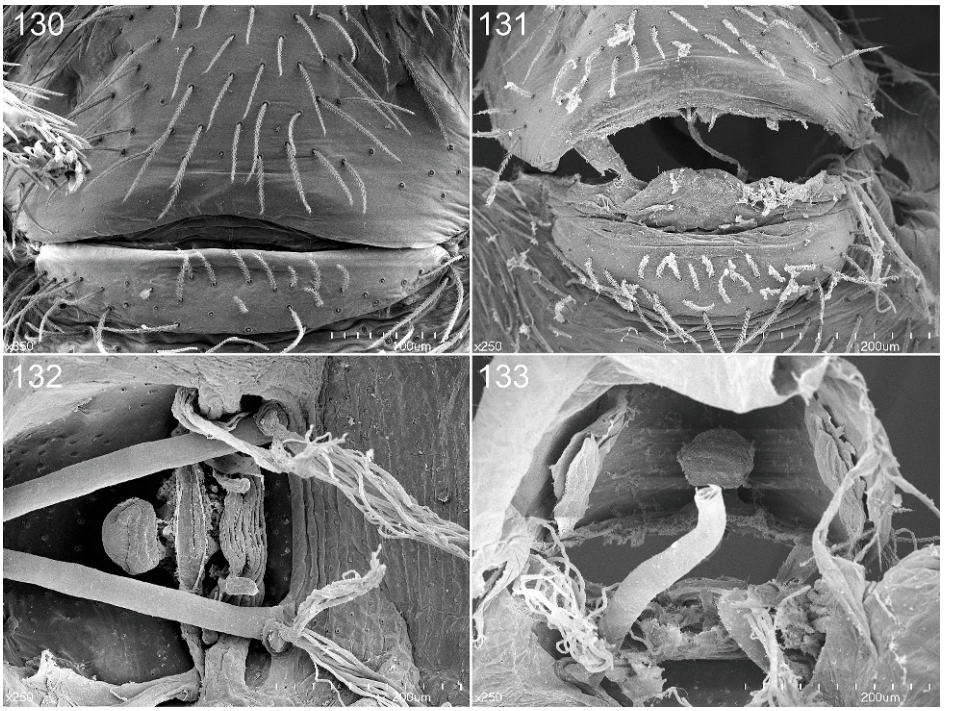
Figs. 106–113. *Heteroonops spinimanus* (Simon), female. **106.** Chelicerae, anterior view. **107.** Same, posterior view. **108.** Palp, prolateral view. **109.** Same, retrolateral view. **110.** Palpal tibia, dorsal view. **111.** Palpal patella, prolateral view. **112.** Same, dorsal view. **113.** Tip of palpal tarsus, retrolateral view.



Figs. 114–121. *Heteroonops spinimanus* (Simon), female. **114.** Metatarsus III, dorsal view. **115.** Claws of leg I, distal view. **116.** Same, leg II. **117.** Same, leg III. **118.** Same, lateral view. **119.** Same, leg IV. **120.** Palpal tarsus, retrolateral view. **121.** Tarsal organ from palp, dorsal view.

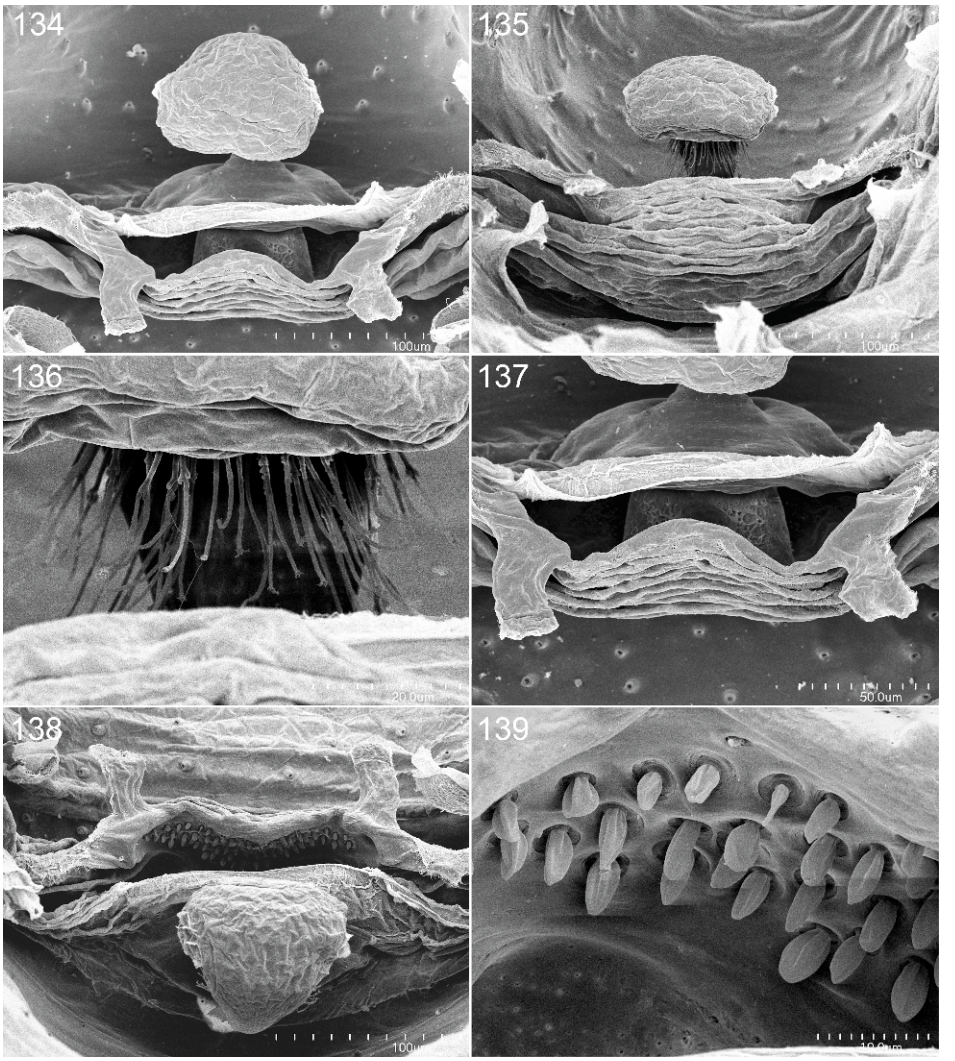


Figs. 122–129. *Heteroonops spinimanus* (Simon), female. **122.** Tarsal organ from leg I, dorsal view. **123.** Same, leg II. **124.** Same, leg III. **125.** Same, leg IV. **126.** Spinnerets, posterior view. **127.** Anterior lateral spinnerets, same. **128.** Posterior median spinnerets, same. **129.** Posterior lateral spinneret, same.



Figs. 130–133. *Heteroonops spinimanus* (Simon), female. **130.** Epigastric region, with epigastric furrow closed, ventral view. **131.** Same, with epigastric region open; note V-shaped projection along midline of anterior elements that apparently fits into v-shaped opening on posterior elements when furrow is closed. **132.** Respiratory system, dorsal view. **133.** Same, showing booklung leaves.

Co.: Ochopee, Everglades, 25°53′N, 81°20′W, Dec. 27, 1963 (J., W. Ivie, AMNH PBI_OON 21171), 1♀. *Dade Co.:* Deering Estate Park, SW 167th St. and SW 72nd Ave., S Miami, Feb. 21–June 1, 1986, young hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 1626), 1♀, June 1–Aug. 25, 1986, same (AMNH PBI_OON 37947, 37949), 2♀, Aug. 26–Dec. 9, 1986, same (AMNH PBI_OON 37953), 1♀; Everglades, W Homestead, 25°20′N, 81°35′W, Dec. 17, 1962 (W. Ivie, AMNH PBI_OON 37919), 1♀; Grossman Hammock, Chekika State Recreation Area, 50 km SW Miami, Mar. 3–Apr. 28, 1985, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37915), 2♀, May 1–Aug. 2, 1985, same (AMNH PBI_OON 37924), 9♀, July 28–Nov. 15, 1985, same (AMNH PBI_OON 37941), 3♀, Nov. 15, 1985–Feb. 24, 1986, same (AMNH PBI_OON 37914), 2♀; Homestead, Mar. 8, 1968, open field (A. Chickering, MCZ 71739, PBI_OON 26470), 3♀, Mar. 9–14, 1968, avocado groves (A. Chickering, MCZ 71737, PBI_OON 26469), 8♀, Mar. 18–21, 1968, same (MCZ 71738, PBI_OON 26398), 36♀, Mar. 23–24, 1968, same (MCZ 71741, PBI_OON 26467), 18♀; Long Pine Key, Everglades National Park, July 31–Dec. 9, 1985, pineland forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37925), 1♀; Old Cutler Hammock, 7900 SW 176th St., S Miami, Feb. 21–June 1, 1986, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37352), 1♀; Royal Palm Hammock, Everglades National Park, July 1981, malaise trough (S. Peck, CNC PBI_OON 38136), 2♀, May 2–Aug. 2, 1985, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37936, 38022), 7♀, July 28–Nov. 15, 1985, hardwood hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37934), 5♀. *Gilchrist Co.:* NE Wilcox, June 27, 1965, open pine-oak pasture (W. Suter, FMNH PBI_OON 10118),



Figs. 134–139. *Heteroonops spinimanus* (Simon), internal female genitalia. **134.** Dorsal view. **135.** Posterior view. **136.** Posterior long ducts of anterior receptaculum, posterior view. **137.** Posterior receptaculum, dorsal view. **138.** Anterior view. **139.** Anterior short ducts of posterior receptaculum, anterior view.

1♀. *Hendry Co.:* Felda, June 18, 1962 (J. Beatty, JAB PBI_OON 269), 1♀. *Highlands Co.:* Archbold Biological Station, 27°11′N, 81°21′W, Apr. 1956, under bark of dead *Pinus elliotti* (C. Hoff, AMNH PBI_OON 37940), 1♀, litter in clumps of saw palmetto (C. Hoff, AMNH PBI_OON 37921), 1♀, Berlese, *Pinus elliotti* litter (C. Hoff, AMNH PBI_OON 37943), 1♀, Dec. 2, 1959 (A. Nadler, AMNH PBI_OON 21170), 1♀, Oct. 1, 1962 (A. Nadler, AMNH PBI_OON 21174), 1♀, Dec. 19, 1962 (W. Ivie, AMNH PBI_OON 37929), 9♀, Feb. 29, 1968 (A. Chickering, MCZ 71736, PBI_OON 26466), 1♀, June 30, 1978, pine litter, elev. 20 m (F., J. Murphy, AMNH PBI_OON 36803), 3♀, July 3, 1978, litter, elev. 20 m (F., J. Murphy, AMNH PBI_OON 36802), 3♀, July 4, 1978, litter, hilltop, elev. 40 m (F., J. Murphy, AMNH PBI_OON 36805), 2♀, July 8, 1978, litter, elev. 20 m

(F., J. Murphy, AMNH PBI_OON 36804), 1♀; Banana Farm, Lake Clay, near Lake Placid, Oct. 5, 1962 (A. Nadler, AMNH PBI_OON 21169), 1♀; Highlands Hammock State Park, along County Road at N boundary, Apr. 5, 1966, palmetto, palm/pine swamp forest (W. Suter, FMNH PBI_OON 10507), 1♀, Apr. 6, 1966, Berlese, swamp (W. Suter, FMNH 34803, PBI_OON 10520), 1♀; Parker Island, 7 mi SE Lake Placid, Mar. 28, 1967, Berlese, wet magnolia swamp, wet floor fern islands, wet litter from *Passalus* log, floor litter under magnolia (W. Suter, FMNH 34806, PBI_OON 10523), 1♀; Sebring, Mar. 7, 1939 (F. Lutz, AMNH PBI_OON 21168), 1♀; Sebring Airport, Feb. 19–20, 1982, fossil dune pine litter (G. Edwards, FSCA PBI_OON 21321), 3♀. *Hillsborough Co.:* Tampa, Aug. 26, 1933, among dead leaves on ground (W. Ivie, AMNH PBI_OON 26738, 26745), 8♀. *Lake Co.:* Leesburg, Mar. 1–11, 1954 (M. Statham, AMNH PBI_OON 21173), 1♀. *Lee Co.:* Fort Myers, 26°38′N, 81°50′W, Feb. 1930 (W. Barrows, AMNH PBI_OON 26743), 1♀, Feb. 1935 (W. Barrows, AMNH PBI_OON 26742), 1♀, Mar. 18, 1954 (W. Ivie, AMNH PBI_OON 37927), 2♀; Fort Myers Beach, 26°26′N, 81°56′W, Mar. 17, 1954 (W. Ivie, AMNH PBI_OON 37932), 7♀. *Leon Co.:* Tall Timbers Research Station, Tallahassee, Apr. 6–9, 1968 (A. Chickering, MCZ71743, PBI_OON 26468), 1♀. *Martin Co.:* Jonathan Dickinson State Park, N Jupiter, June 15, 1962 (J. Beatty, JAB PBI_OON 268), 1♀; Port Mayaca, Mar. 2, 1957 (W. Gertsch, R. Forster, AMNH PBI_OON 21172), 5♀; 8 mi NNW Stuart, 27°17′N, 80°17′W, Dec. 12, 1962 (W. Ivie, AMNH PBI_OON 38021), 3♀. *Monroe Co.:* Big Pine Key, E end, 24°40′N, 81°22′W, Dec. 13, 1962 (W. Ivie, AMNH PBI_OON 37930), 1♀, Nov. 17, 1985–Feb. 25, 1986, cactus hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37928), 1♀; Big Torch Key, SW quarter, Aug. 4–Nov. 19, 1985, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37939), 3♀, June 5–Aug. 28, 1986, same (AMNH PBI_OON 37920), 1♀, Sept. 1–Dec. 15, 1986, same (AMNH PBI_OON 37960), 1♀; Cudjoe Key, SE quarter, Aug. 29–Dec. 14, 1986, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37931, 37946), 3♀; Fat Deer Key, Aug. 2–Nov. 16, 1985, hardwood hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37917), 1♀, Nov. 18, 1985–Feb. 25, 1986, same (AMNH PBI_OON 37950, 37954), 4♀, Aug. 31–Dec. 15, 1986, same (AMNH PBI_OON 37350), 1♀; Everglades National Park, Mar. 11–22, 1968 (A. Chickering, MCZ 71742, PBI_OON 26465), 2♀; Everglades National Park, 1.5 km NW Royal Palm, Nov. 1, 1984–Mar. 3, 1985, hardwood hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37952), 1♀; Key Largo, Apr. 1, 1957 (W. Gertsch, R. Forster, AMNH PBI_OON 21164), 1♀; Kitchings, Sugar Loaf Key, Aug. 4–Nov. 19, 1985, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37937, 37957), 5♀, Nov. 19, 1985–Feb. 26, 1986, same (AMNH PBI_OON 37955), 2♀, Feb. 26–June 6, 1986, same (AMNH PBI_OON 37935), 1♀, June 6–Aug. 29, 1986, same (AMNH PBI_OON 37958), 3♀, Aug. 29–Dec. 14, 1986, same (AMNH PBI_OON 37945, 37959), 7♀; Key Largo Key, 25°10′N, 80°20′W, Dec. 17, 1962 (W. Ivie, AMNH PBI_OON 37933), 1♀; 2 mi SE Marathon, 24°37′N, 81°06′W, Dec. 15, 1962 (W. Ivie, AMNH PBI_OON 37926), 18♀, same (AMNH PBI_OON 37347), 1♂; Pennekamp State Park, Key Largo, Aug. 1–Nov. 16, 1985, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37916), 1♀, Nov. 16, 1985–Feb. 24, 1986, same (AMNH PBI_OON 37918), 4♀, Feb. 24–June 2, 1986, same (AMNH PBI_OON 37962), 2♀, June 2–Aug. 26, 1986, same (AMNH PBI_OON 37938, 37948),3♀, Aug. 27–Dec. 12, 1986, same (AMNH PBI_OON 37942), 2♀; Sugarloaf Key, SW quarter, Aug. 5–Nov. 19, 1985, hardwood hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37956), 2♀; Vaca Key, Marathon, Aug. 31–Dec. 15, 1986, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37961), 1♀; Watsons Hammock, Big Pine Key, May 3–Aug. 3, 1985, hardwood hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 38018), 1♀, Aug. 1, 1985, hammock forest litter (S., J. Peck, AMNH

PBI_OON 37944), 3♀, June 3–Aug. 27, 1986, hammock forest, malaise-flight intercept trap (S., J. Peck, AMNH PBI_OON 37922), 2♀. *Orange Co.:* 3 mi NW Maitland, 28°38′N, 81°24′W, Dec. 10, 1962 (W. Ivie, AMNH PBI_OON 37951), 1♀. *Palm Beach Co.:* Royal Palm Park, Feb. 18, 1925 (W. Barrows, AMNH PBI_OON 26740), 1♀, Feb. 26, 1936 (AMNH PBI_OON 21165), 1♀; Royal Palm Station, Feb. 14, 1951 (A. Nadler, AMNH PBI_OON 21167), 1♀. *Pinellas Co.:* Dunedin (W. Ivie, AMNH PBI_OON 26739), 3♀. *Polk Co.:* Lake Alfred, Rt. S-17, May 12, 1969, flat pine land, pitfall (K. Stone, FSCA PBI_OON 21328), 1♀; Winter Haven, Oct. 5, 1967, sand dune, pitfall (M. Muma, H. Greene, FSCA PBI_OON 21325), 1♀, Oct. 16, 1967, shady back yard, pitfall (M. Muma, H. Greene, FSCA PBI_OON 21327), 1♀, Oct. 30, 1967, pitfall, under oak (M. Muma, H. Greene, FSCA PBI_OON 21322), 1♀, Aug. 7, 1969, sand pine, pitfall (M. Muma, H. Greene, FSCA PBI_OON 21323), 1♀, Dec. 8, 1969, sand pine, pitfall (M. Muma, H. Greene, FSCA PBI_OON 21326), 1♀, Feb. 18, 1970, sand pine, pitfall (M. Muma, H. Greene, FSCA PBI_OON 21324), 1♀. *Seminole Co.:* junction, Highway 427 and County Road 415, service road near church, Mar. 30, 2003, leaf litter, mangrove/palm swamp (D. Dabney, CAS 9025876, PBI_OON2390), 1♀. *Volusia Co.:* De Land, Mar. 25, 1939 (F. Lutz, AMNH PBI_OON 21175), 3♀. MEXICO: **Quintana Roo:** San Juan, Cozumel, Aug. 7, 1949 (C., M. Goodnight, AMNH PBI_OON 1613), 2♀. **San Luis Potosí:** 1 mi SW Tamazunchale, 21°15′N, 98°49′W, July 25, 1966 (J., W. Ivie, AMNH PBI_OON 38020), 1♀. CENTRAL AMERICA: **Costa Rica:** *Alajuela:* Grecia, Nov. 27, 1955 (B. Malkin, AMNH PBI_OON 270), 1♀. *Cartago:* Turrialba, July 25–Aug. 15, 1965 (A. Chickering, MCZ 71734, 71735, PBI_OON 26396, 26447), 26♀. *Heredia:* San Joaquín, July 6, 1997 (C. Víquez, INBIO 47241, PBI_OON 30991), 1♀. **Panama:** *Canal Zone:* Balboa, May 25, 1964 (A. Chickering, MCZ 71732, PBI_OON 26399), 1♀; Gamboa, Jan. 1958 (A. Chickering, MCZ 71730, PBI_OON 26395), 3♀; Gatun, Feb. 15, 1958 (A. Chickering, MCZ 66703, PBI_OON 26462), 1♀; Summit Gardens, July 12, 1954 (A. Chickering, MCZ 71731, PBI_OON 26463), 1♀, May 12, 1964 (A. Chickering, MCZ 71729, PBI_OON 26461), 1♀. *Chiriquí:* Boquete, Aug. 1950 (A. Chickering, MCZ 71733, PBI_OON 26464), 5♀, Aug. 1954 (A. Chickering, MCZ 66702, PBI_OON 26394), 15♀. WEST INDIES: **Bahama Islands:** San Salvador Island, May 9–15, 1982 (B. Bowen, CNC PBI_OON 38133), 1♀; South Bimini, May 1951 (W. Gertsch, M. Cazier, AMNH PBI_OON 21161), 36♀, June 1951 (M. Cazier, C., P. Vaurie, AMNH PBI_OON 21162, 21163), 5♀. **Bermuda:** no specific locality, 1901 (A. Verrill, PMY 2340, PBI_OON 312), 1♀ (holotype); Paget Parish, near Elbow Beach Surf Club, Jan. 1, 1964, garbage in scrub forest (W. Suter, FMNH 33599, PBI_OON 10106), 1♀. GREATER ANTILLES: **Cuba:** *Oriente:* Soledad, Aug. 1–11, 1934 (P. Darlington, MCZ 71802, PBI_OON 26610), 2♀. **Jamaica:** *Clarendon:* Salt River, Nov. 24, 1963 (A. Chickering, MCZ 71744, PBI_OON 26452), 3♀. *Hanover:* Roundhill, Nov. 21, 1959 (A. Nadler, AMNH PBI_OON 21157), 1♀. *Manchester:* Christiana, Nov. 13–14, 1957 (A. Chickering, MCZ 71798, PBI_OON 26611), 10♀; halfway between Troy and Christiana, Nov. 13, 1957 (A. Chickering, MCZ 71757, PBI_OON 26456), 1♀. *St. Andrew:* near August Town, May 29, 1956, litter among roots of kapok tree (C. Hoff, MCZ 71799, PBI_OON 26864), 2♀; Bamboo Ave., Liguanea, Nov. 14, 1957 (A. Chickering, MCZ 71767, PBI_OON 26912), 2♀; Buttercup Drive, Mona, Dec. 1, 1963 (A. Chickering, MCZ 71764, PBI_OON 26911), 1♀; Cooper's Hill, Feb. 10, 1955, elev. 2400 ft (P. Bellinger, MCZ 71751, PBI_OON 26460), 2♀; Fairway Ave., Liguanea, Nov. 1963 (A. Chickering, MCZ 71769, PBI_OON 26885), 30♀; Dec. 24, 1963 (A. Chickering, MCZ 71770, PBI_OON 26914), 3♀; Fairy Glade, May 1955 (P. Bellinger, MCZ 71765, PBI_OON 26891), 1♀; Ferry, Oct. 1957 (A. Chickering, MCZ 71782, PBI_OON 26893), 7♀; Ferry, 1 mi W Red Hills Road, Sept. 27, 1957 (A. Chickering, MCZ 71766, PBI_OON 26890), 1♀; Hermitage Reservoir, Nov. 1957 (A. Chickering, MCZ 71773, PBI_OON 26902), 6♀; Hermitage Road, Nov. 28, 1963 (A. Chickering, MCZ 71772, PBI_OON 26904), 16♀; Hope Gardens, Oct. 23, 1957

(A. Chickering, MCZ 71788, PBI_OON 26881), 5♀, Nov. 2, 1957 (A. Chickering, MCZ 71762, PBI_OON 26454), 6♀, Nov. 27, 1963 (A. Chickering, MCZ 71760, PBI_OON 26455), 3♀, Dec. 1963 (A. Chickering, MCZ 71761, 71780, 71789, PBI_OON 26451, 26906, 26907), 61♀; Hope Road, Dec. 1963 (A. Chickering, MCZ 71785, PBI_OON 26888), 11♀; Jack's Hill Road, Dec. 6, 1957 (A. Chickering, MCZ 71793, PBI_OON 26901), 3♀; Mona, Oct. 1957, hay debris (A. Chickering, MCZ 71781, PBI_OON 26915), 23♀, Oct. 11, 1957, citrus orchard (A. Chickering, MCZ 71763, PBI_OON 26882), 7♀; Mona Heights, Dec. 15–29, 1963 (A. Chickering, MCZ 71779, PBI_OON 26908), 198♀; Mona Road, Oct. 14, 1957 (A. Chickering, MCZ 71787, PBI_OON 26894), 4♀, Nov. 1963 (A. Chickering, MCZ 71783, PBI_OON 26899), 38♀, Dec. 1963 (A. Chickering, MCZ 71786, PBI_OON 26905), 31♀; Monroe Road, Liguanea, Oct. 15, 1957 (A. Chickering, MCZ 71768, PBI_OON 26889), 3♀; Mt. Pleasant, Oct. 24, 1957 (A. Chickering, MCZ 71771, PBI_OON 26883), 5♀; Newcastle Road, 5 mi NE Kingston, May 10, 1956, under bark of log (C. Hoff, MCZ 71800, PBI_OON 26865), 1♀; Old Hope Road, Liguanea, Oct. 8, 1957 (A. Chickering, MCZ 71794, PBI_OON 26909), 3♀, Dec. 3, 1963 (A. Chickering, MCZ 71792, PBI_OON 26903), 6♀; Reservoir Aqueduct, Nov. 30, 1963 (A. Chickering, MCZ 71776, PBI_OON 26886), 30♀; Richards Reservoir, Nov. 1957 (A. Chickering, MCZ 71775, PBI_OON 26910), 26♀, Nov. 23, 1963 (A. Chickering, MCZ 71774, PBI_OON 26898), 12♀, Dec. 18, 1963 (A. Chickering, MCZ 71784, PBI_OON 26913), 15♀; Stony Hill, Oct. 1957 (A. Chickering, MCZ 71791, PBI_OON 26922), 6♀; Trafalgar Road, Nov. 9, 1963 (A. Chickering, MCZ 71795, PBI_OON 26897), 3♀. *St. Ann:* Mt. Diablo Forest Preserve, Nov. 6, 1963 (A. Chickering, MCZ 71749, PBI_OON 26457), 2♀; St. Ann's Bay, Mar. 19, 1955 (A. Nadler, AMNH PBI_OON 21158), 1♀. *St. Catherine:* E end, Innswood Estate, Nov. 10, 1963 (A. Chickering, MCZ 71778, PBI_OON 26896), 4♀; 3 mi E May Peninsula, Nov. 22, 1957 (A. Chickering, MCZ 71755, PBI_OON 26448), 1♀; Old Harbour, Oct. 9, 1957 (A. Chickering, MCZ 71756, PBI_OON 26458), 2♀; roadsidenear School of Agriculture, Oct. 10, 1957 (A. Chickering, MCZ 71899, PBI_OON 26614), 6♀; School of Agriculture, Nov. 1957 (A. Chickering, MCZ 66700, PBI_OON 26884), 5♀; 1.5 mi SW Spanish Town, Oct. 10, 1957 (A. Chickering, MCZ 71797, PBI_OON 26900), 2♀; 8 mi W Spanish Town, Dec. 2, 1957 (A. Chickering, MCZ 71753, PBI_OON 26459), 2♀. *St. Thomas:* 6 mi NE Bath, Dec. 10, 1957 (A. Chickering, MCZ 71790, PBI_OON 26895), 6♀; Morant Bay, Oct. 29, 1957 (A. Chickering, MCZ 71758, PBI_OON 26397), 6♀; Roselle Falls, Oct. 29, 1957 (A. Chickering, MCZ 71759, PBI_OON 26453), 2♀. *Trelawny:* 12 mi S Falmouth, May 13, 1956, from bromeliads (C. Hoff, MCZ 71750, PBI_OON 26450), 1♀; Glastonbury, Nov. 14, 1957 (A. Chickering, MCZ 71752, PBI_OON 26400), 1♀; Good Hope, Aug. 11, 1966 (H. Howden, CNC PBI_OON 38135), 1♀. *Westmoreland:* Negril, Mar. 29, 1981, litter under large breadnut tree (H., L. Levi, MCZ PBI_OON 28126), 1♀. **Puerto Rico:** Mayagüez, Jan. 21, 1964, leaf litter among coffee trees (A. Chickering, MCZ 71823, PBI_OON 26606), 1♀; Mayagüez, E Nuclear Center, Jan. 13, 1964 (A. Chickering, MCZ 71809, PBI_OON 26603), 2♀; Mayagüez, University campus, Jan. 7, 1964 (A. Chickering, MCZ 71810, PBI_OON 26863), 3♀; Mayagüez, University farm, N of campus, Jan. 17, 1964 (A. Chickering, MCZ 71812, PBI_OON 26604), 1♀; 3 mi S Mayagüez, road to Hormigueros, Jan. 8, 1964 (A. Chickering, MCZ 71811, PBI_OON 26602), 1♀; 5 km E Mayagüez, Jan. 19, 1964 (A. Chickering, MCZ 71813, PBI_OON 26605), 11♀. LESSER ANTILLES: **Virgin Islands:** *St. Croix:* no specific locality, Sept. 3, 1966 (A. Chickering, MCZ 71815, PBI_OON 26858), 1♀; King's Hill, Mar. 17, 1964 (A. Chickering, MCZ 71814, PBI_OON 26859), 1♀. *St. John:* no specific locality, July 23, 1966 (A. Chickering, MCZ 71816, PBI_OON 26612), 1♀; Cruz Bay, Feb. 28–Mar. 7, 1964 (A. Chickering, MCZ 71817, PBI_OON 1790), 7♀. *St. Thomas:* no specific locality, July 27, 1966 (A. Chickering, MCZ 71820, PBI_OON 26855), 2♀, Aug. 1966 (A. Chickering, MCZ 71821, PBI_OON 26613), 6♀, open fields, vacant lots, Feb. 19–24, 1964 (A. Chickering,

MCZ 71819, PBI_OON 26856), 46♀; Charlotte Amalie, Feb. 12–16, 1964, hay and weed debris (A. Chickering, MCZ 71898, PBI_OON 26854), 38♀; High School Grounds, Charlotte Amalie, Mar. 10–11, 1964 (A. Chickering, MCZ 71822, PBI_OON 26857), 51♀. *Tortola:* no specific locality, July 30–Aug. 5, 1966 (A. Chickering, MCZ 71807, PBI_OON 26860), 7♀, Aug. 22–23, 1966 (A. Chickering, MCZ 71806, PBI_OON 26609), 3♀. LEEWARD ISLANDS: **Nevis:** no specific locality, Sept. 24–29, 1966 (A. Chickering, MCZ 71805, PBI_OON 26608), 4♀. **St. Kitts:** no specific locality, Sept. 14–22, 1966 (A. Chickering, MCZ 66697, PBI_OON 26449), 1♀. WINDWARD ISLANDS: **St. Lucia:** no specific locality, Oct. 5–13, 1966 (A. Chickering, MCZ 71803, PBI_OON 26601), 4♀. **St. Vincent:** no specific locality, Oct. 15–24, 1966 (A. Chickering, MCZ 71808, PBI_OON 26607), 15♀. **Trinidad:** Simla, Apr. 20, 1964 (A. Chickering, MCZ 71804, PBI_OON 26861), 1♀. SOUTH AMERICA: **Colombia:** *Valle del Cauca:* Cali, Dec. 19, 1958 (A. Nadler, AMNH PBI_OON 1322), 1♀. **Venezuela:** *Bolívar:* Parupá, La Gran Sabana, June 27–July 10, 1987, forest-grassland edge, Malaise flight intercept trap, elev. 1500 m (S., J. Peck, AMNH PBI_OON 1043, 1044), 2♀. *Distrito Federal:* Caracas (E. Simon, MNHN 1470, PBI_OON 2386), 5♀ (syntypes). OLD WORLD: **Madeira:** Funchal, Apr. 21, 1973, hotel grounds, elev. 30 m (F., J. Murphy, AMNH PBI_OON 36801), 1♀. **St. Helena:** Basse Fisher's Valley, Dec. 14–15, 1965, elev. 1000 ft (P. Basilewsky, P. Benoit, H. Leleup, MRAC 129087, PBI_OON 33792), 1♀ (abdomen only). **Madagascar:** *Toamasina:* Ambatovy, 12.4 km NE Moramanga, 18°50′52″S, 48°17′44″E, Mar. 5–8, 2007, pitfall trap, grassland, elev. 1000 m (B. Fisher et al., CAS 9036072, PBI_OON 3916), 1♀ (identified by D. Ubick). **Seychelle Islands:** *Mahé:* Bon Espoir, June 21, 1972, grass clumps, elev. 300 m (P. Benoit, J. Van Mol, MRAC143236, PBI_OON 33793), 2♀. *Silhouette:* Anse Cimitière, Jan. 18, 1999, from old stems of *Ipomea* hanging down from stones (M. Saaristo, MZUT AA 1,236, PBI_OON 5399), 1♂ (holotype). **Hawaii:** *Hawaii:* Kalopa State Park, Feb. 13, 1995, forest litter (J. Berry, JAB PBI_OON 273), 1♀; Manuka State Park, Feb. 11, 1995, mesic forest, elev. 1750 ft (J., E. Berry, JAB PBI_OON 276), 2♀; Puna District, Route 137, mile marker 17–18, Jan. 31, 1997, coconut palm trashpile (J., E. Berry, JAB PBI_OON 277), 1♀; Puna District, Route 137, mile marker 20.5, Feb. 1, 1997, scrubland litter (J., E. Berry, JAB PBI_OON 279), 1♀; Puna District, Route 137, 1 mi W Mackenzie State Park, Jan. 31, 1997, *Casuarina* litter (J., E. Berry, JAB PBI_OON 38267), 2♀; Route 190, mile marker 29.5, Feb. 17, 1995, roadside grass, litter (J., E. Berry, JAB PBI_OON 272), 1♀; Route 250, Feb. 17, 1995, *Casuarina* bark and litter, roadside, elev. 3500 ft (J., E. Berry, JAP PBI_OON 274), 1♀; Whittington Beach Park, Kau District, Route 11, Feb. 4, 1997, litter (J., E. Berry, JAB PBI_OON 271), 1♀. *Kauai:* trail to Kahili Mountain, near Koloa, Jan. 12, 1998, litter, elev. 1700 ft (J., E. Berry, JAB PBI_OON 275), 1♀; Makaha Ridge Road, Jan. 23, 1998, pine forest litter, elev. 2000 ft (J., E. Berry, JAB PBI_OON 278), 4♀. *Lanai:* Lanai City, Sept. 22, 1957 (A. Nadler, AMNH PBI_OON 37963), 1♀. *Oahu:* Kaneoe Bay, Jan. 15, 1983, in mangrove litter (V. Roth, AMNH PBI_OON 21003), 1♀; Kolekole Pass, Apr. 17, 1967, malaise trap, elev. 1725 ft (CNC PBI_OON 38137), 1♀; Manawahua, Waianae Mountains, Nov. 23, 1951 (W. Mitchell, AMNH PBI_OON 37923), 1♀; SE slope, Ulumawao Peak, Kailua, Nov. 8, 1964, leaf mold (T. Suman, BPBM 3742, PBO_OON 292), 1♀ (holotype). **Marquesas Islands:** *Hiva Oa:* Atuona Harbor, Feb. 8, 1987, grass clump (JAB PBI_OON 286), 1♀; Hanamenu, Feb. 4, 1987, *Hibiscus* litter (JAB PBI_OON 285), 1♀. *Nuku Hiva:* Toovii, Jan. 29, 1987, grass clump, elev. 600 m (J., E. Berry, JAB PBI_OON 38318), 1♀. **Cook Islands:** *Aitutaki:* near airport, Mar. 29, 1987, grass litter (J. Berry, JAB PBI_OON 282), 3♀; Anaunga District, Mar. 27, 1987, *Scaevola* litter (J., E. Berry, JAB PBI_OON 38317), 1♀. *Rarotonga:* Arorongi, near Raemaru Mountain, Mar. 12, 1987, grass clump, elev. 300 m (JAB PBI_OON 283), 1♀; above Black Rock, Mar. 12, 1987, fern field, elev. 100 m (JAB PBI_OON 284), 2♀. **Pitcairn Island:** head of St. Paul's Valley, July 17, 1997, in *Homalium* tree grove, under ferns (J. Starmer, JAB PBI_OON 280), 1♀. **Fiji:** *Viti Levu:* Nadi Bay,

Apr. 20, 1987, beach rubble, sea plane jetty (J.Berry, JAB PBI_OON 281), 1♀; Nandarivatu, May 14, 1987, litter under eucalypt tree beside guest house (J. Berry, JAB PBI_OON 38320), 4♀. **New Caledonia:** Ouen Toro, Noumea, Sept. 3, 1990, dry forest, elev. 125 m (N. Platnick, R. Raven, P. Goloboff, AMNH PBI_OON 21056), 1♀. **Australia:** *Queensland:* Heron Island, site 4, 23°443′S, 151°917′E, Nov. 7–9, 2008, Malaise trap, *Pisonia* forest, elev. 0–5 m (A. Nakamura, QMB S87193, PBI_OON 23374), 5♀, same, pitfall trap (QMB S87183, PBI_OON 23375), 1♀ (all examined and identified by Barbara Baehr, confirmed from photos).

DISTRIBUTION: Pantropical, and even introduced into some temperate areas, such as greenhouses in Germany (Kielhorn, 2008). If the prolaterally dilated female palpal patella is a synapomorphy uniting this species with *H. singulus*, *H. murphyorum*, and *H. andros*, the species is probably native only to some part of the western Caribbean, like the other members of this small species group.

SYNONYMY: Suman's redescription of the species appears to have been the result of a generic misplacement.

Heteroonops singulus (Gertsch and Davis), new combination

Figures 140–147

Oonops singulus Gertsch and Davis, 1942: 6, fig. 10 (female holotype from Potrero, Veracruz, Mexico, in AMNH; examined).

DIAGNOSIS: Gertsch and Davis (1942) noted that the female holotype of this species has a "very long, strongly spined palpus" and therefore concluded, "It belongs in the group for which the generic name *Oonopoides* was proposed, with *Oonops spinimanus* Simon as genotype" (their mention of *Oonopoides* here was obviously just a lapsus for *Heteroonops*). They indicated that *O. singulus* has "the eyes less widely separated," but we've detected no significant differences in the eye patterns of the two species. However, the female genitalia of *O. singulus* are distinctive, with a V-shaped posterior sclerotization and a T-shaped anterior receptaculum (figs. 145–147).

MALE: Unknown.

FEMALE (PBI_OON 36745, figs. 140–144): Total length 1.46. Palpal patella prolaterally dilated at half its length. Abdominal venter without pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I, II d1-0-0; III d0-0-1; IV d0-1-0; tibiae: I, II v0-0-1; III v0-2-2; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II v1-0-0; III v0-0-2, r0-0-1; IV p1-0-0, v2-0-2, r1-0-0. Palpal spination: femur v1-1-1, patella p0-1-1, tibia p2-1-0, v0-1-1, tarsus p1-1-0, v1-1-0. Anterior receptaculum anteriorly expanded, flared, followed posteriorly by V-shaped sclerotization (figs. 145–147).

MATERIAL EXAMINED: MEXICO: **Veracruz:** Potrero, June 24, 1936 (L. Davis, AMNH PBI_OON 36745), 1♀ (holotype); Veracruz, June 27, 1953 (C. Goodnight, AMNH PBI_OON 1623), 1♀.

DISTRIBUTION: Veracruz, Mexico.

Heteroonops murphyorum, new species

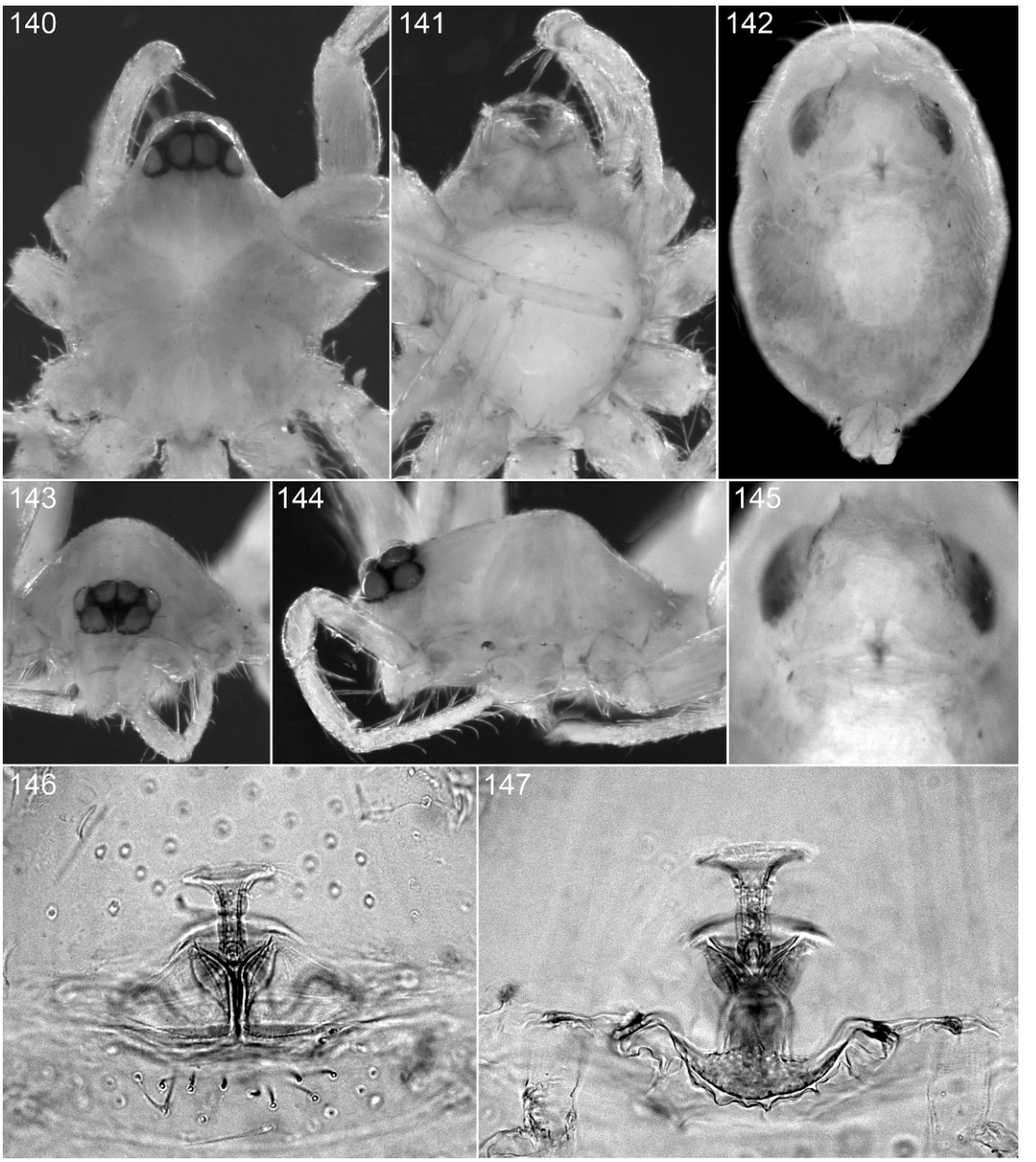
Figures 148–168

TYPES: Male holotype and female allotype taken from shrubs and litter at an elev. of 500 m at Laguna de Arenal, Guanacaste, Costa Rica (Aug. 19, 1983; J., F. Murphy), deposited in AMNH (PBI_OON 36756).

ETYMOLOGY: The specific name is a patronym in honor of the collectors of the types and many other fascinating oonopids.

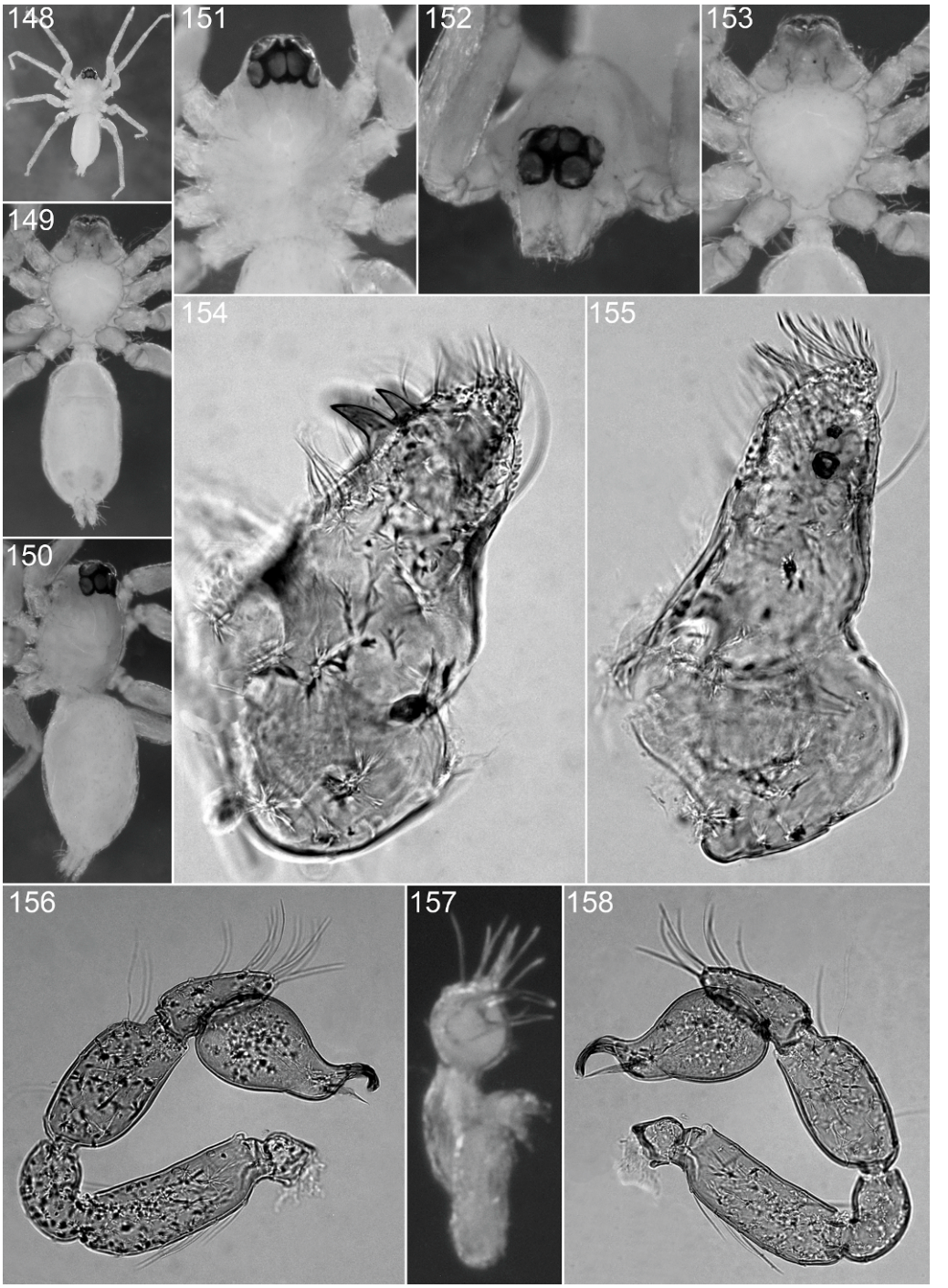
DIAGNOSIS: Males resemble those of *H. spinimanus* in having two longitudinally situated projections on each endite (fig. 153), but the posterior projection is smaller (fig. 154); females have a very thin transverse bar on the anterior receptaculum (figs. 166–168).

MALE (PBI_OON 36756, figs. 148–152): Total length 1.40. Endites each with two posteriorly directed projections, posterior one not enlarged (figs. 153–155). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I, II d1-0-1; III d1-0-1; IV d1-0-0; tibiae: I, II v0-2-0; III p1-1-0, v0-1-1, r0-1-0; metatarsi: I v0-1-0; II v1-0-0; III v1-2-0, r0-1-0; IV p0-0-1, v1-0-0, r0-0-1; tarsi IV v0-1-1. Embolus long, slightly arched, distal half darkened, conductor shorter, sharply pointed, translucent (figs. 156–158).

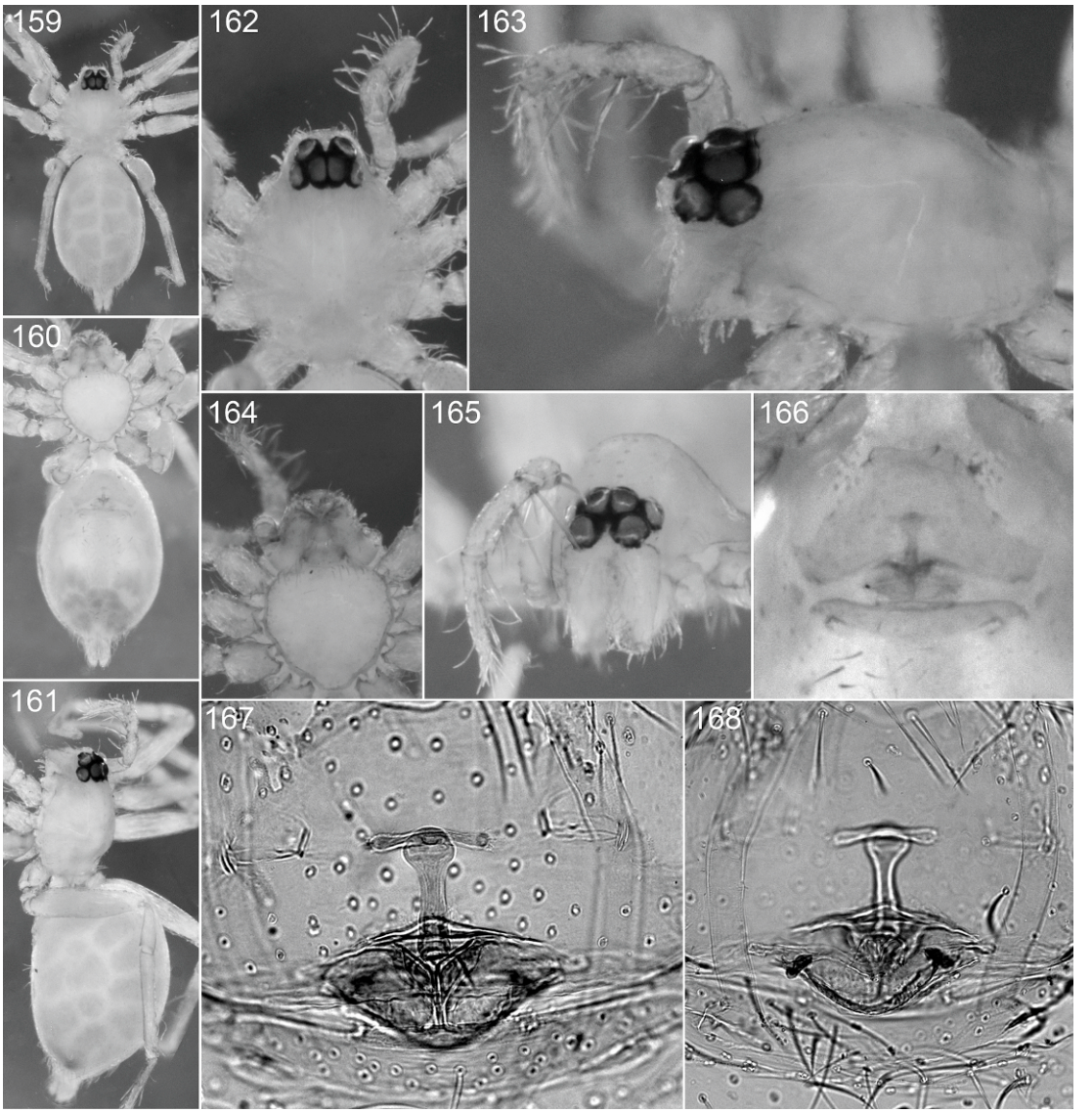


Figs. 140–147. *Heteroonops singulus* (Gertsch and Davis), female. **140.** Carapace and palp, dorsal view. **141.** Same, ventral view. **142.** Abdomen, ventral view. **143.** Carapace and palp, anterior view. **144.** Same, lateral view. **145.** Epigastric region, ventral view. **146.** Genitalia, ventral view. **147.** Same, dorsal view.

FEMALE (PBI_OON 36756, figs. 159–165): Total length 1.43. Palpal patella prolaterally dilated at half its length. Leg spination: femora: I, II d1-0-0; III, IV d1-0-0; tibiae: I, II v0-2-0; III p0-1-0, v0-2-0; IV p0-1-1, v0-1-2; metatarsi: I, II v2-2-0; III d1-0-0, v1-2-0, r1-1-0; IV d1-0-0, p1-1-0, v1p-2-0, r1-1-0. Palpal spination: femur v1-1-0, patella p0-1-1, tibia



Figs. 148–158. *Heteroonops murphyorum*, new species, male. **148.** Habitus, dorsal view. **149.** Same, ventral view. **150.** Same, lateral view. **151.** Carapace, dorsal view. **152.** Same, anterior view. **153.** Cephalothorax, ventral view. **154.** Endite, retrolateral view. **155.** Same, ventral view. **156.** Palp, prolateral view. **157.** Same, ventral view. **158.** Same, retrolateral view.



Figs. 159–168. *Heteroonops murphyorum*, new species, female. **159.** Habitus, dorsal view. **160.** Same, ventral view. **161.** Same, lateral view. **162.** Carapace and palp, dorsal view. **163.** Same, lateral view. **164.** Same, ventral view. **165.** Same, anterior view. **166.** Epigastric region, ventral view. **167.** Genitalia, ventral view. **168.** Same, dorsal view.

p1-2-2, v1-1-1, tarsus p1-2-2, v1-1-2. Anterior receptaculum T-shaped, with thin transverse bar (figs. 166–168).

OTHER MATERIAL EXAMINED: COSTA RICA: **Guanacaste:** Cerro Azul, Bella Vista, Nandayure, 9°86′58″N, 85°16′19″W, Apr. 12, 2002, fogging, elev. 1050 m (W. Porras, AMNH PBI_OON 30989), 1♂, 1♀. **Puntarenas:** Monteverde, Aug. 24, 1983, roadside scrub, elev. 1500 m (J., F. Murphy, AMNH PBI_OON 36762), 1♂.

DISTRIBUTION: Costa Rica.

Heteroonops andros, new species

Figures 169–175

TYPE: Female holotype taken in a Berlese sample of coastal coppice litter at Pigeon Cay, Andros Island, Bahama Islands (May 1–6, 1994; R. Anderson), deposited in AMNH (PBI_OON 21177).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Females can be recognized by the triangular anterior receptaculum with a wide, translucent sac (figs. 173–175).

MALE: Unknown.

FEMALE (PBI_OON 21177, figs. 169–172): Total length 1.80. Palpal patella prolaterally dilated at half its length. Abdominal venter without pair of subcuticular dark spots just anterior of spinnerets. Leg spination (leg II missing): femora: I d1-0-0; III, IV d1-0-1; tibiae: I v0-2-2; III p1-1-0, v0-2-2, r0-1-0; IV d0-1-0, p1-0-1, v0-1-2, r1-0-1; metatarsi: I v2-0-2; III d1-0-0, v0-2-2, r1-0-1; IV d1-0-0, p1-0-1, v2-1-2, r1-0-1. Palpal spination: femur v1-1-1, patella p0-1-1, tibia p1-1-2, v1-1-2, tarsus p1-3-1, v2-1-2. Anterior receptaculum consisting of sclerotized triangle leading to membranous sac; posterior receptaculum with presumed secretory glands arrayed in rows (figs. 173–175).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Bahama Islands.

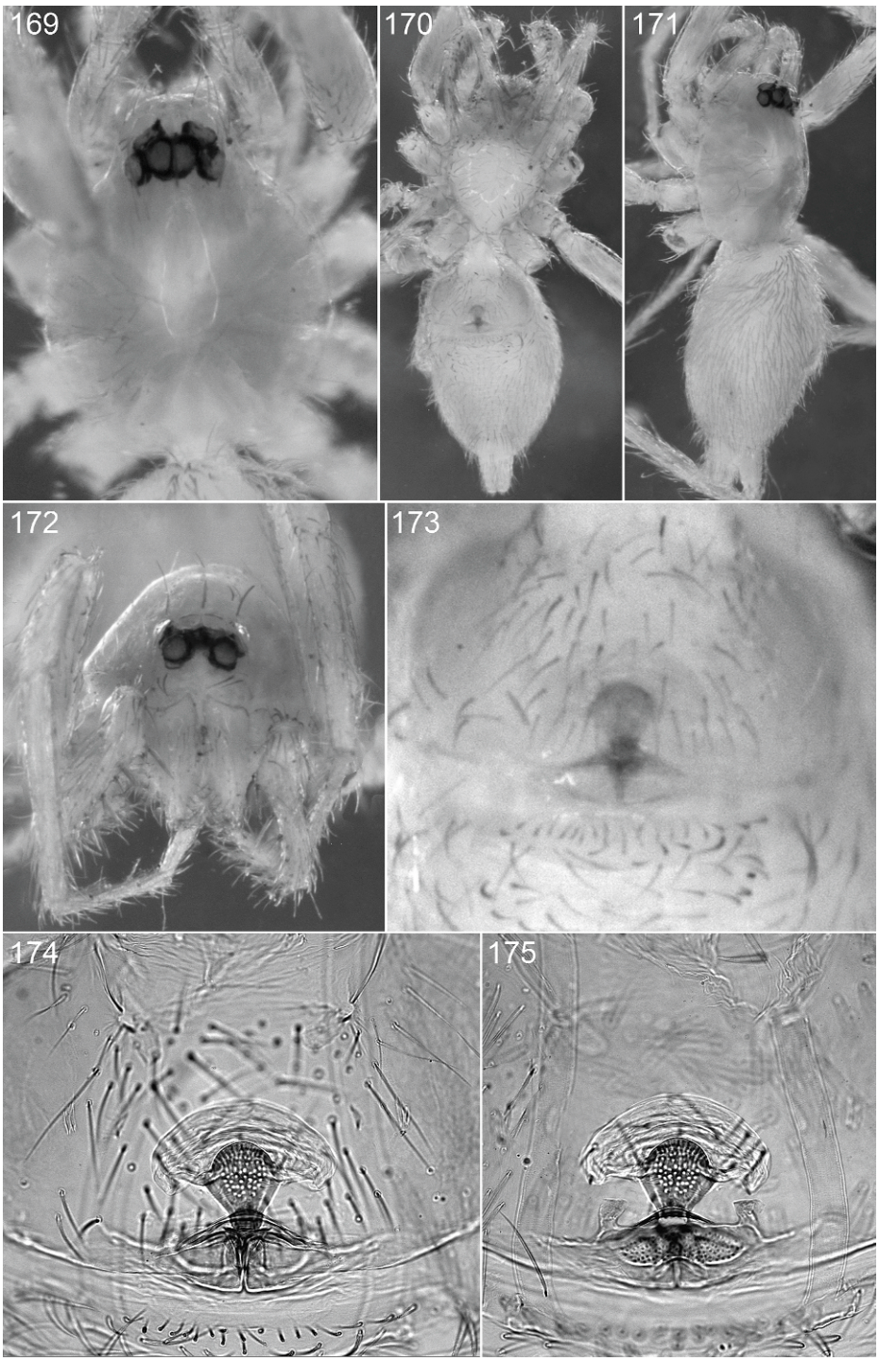
The Cuban Species

The paper on Cuban oonopids by Dumitresco and Georgesco (1983) includes descriptions of at least three species that may belong to *Heteroonops*, but all three descriptions are problematic. As indicated above, the specimens studied by those investigators are not available on loan, but probably wouldn't prove to be very helpful even if they could be re-examined. Judging from the detailed figures in their paper, Dumitresco and Georgesco treated the specimens like mites, and probably mounted them in Hoyer's medium on "permanent" slides. During that process, the male and female genitalia would have been smashed flat by the weight of the cover slips, making comparisons with normal, three-dimensional specimens difficult.

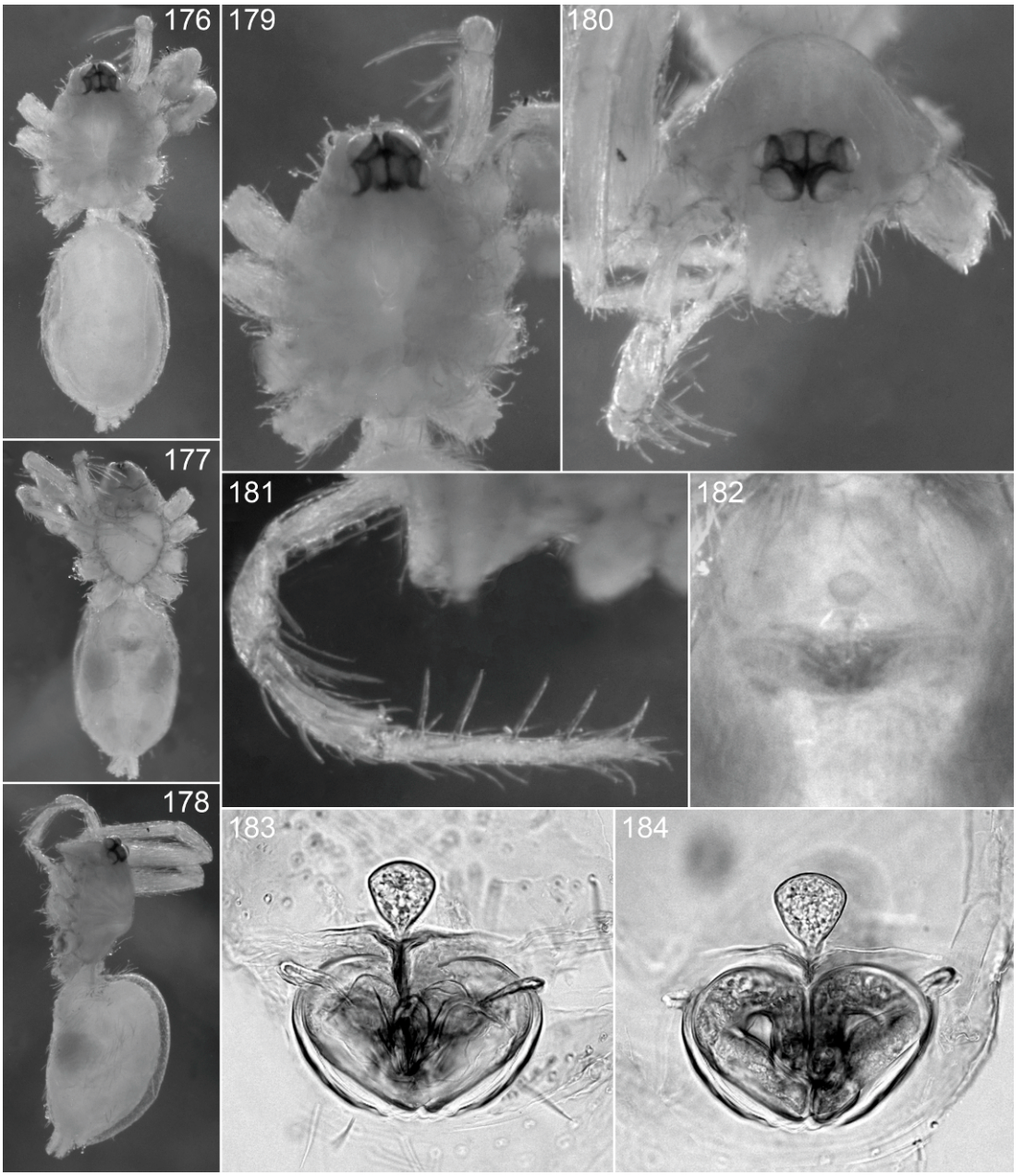
The only Cuban specimens of the genus we have been able to examine are the two females of *H. spinimanus* recorded above. Dumitresco and Georgesco (1983: 88, pl. 13, figs. 1–5) recorded one female of that species from the Isla de Pinos, but we are not convinced that this female was correctly identified. First, as noted above, Dumitresco and Georgesco indicated that this specimen lacks a dilation on the palpal patella; in addition, their illustrations show that the anterior receptaculum is scarcely expanded at its anterior end. One possible complication is that the overall appearance of the female genitalia, in this species (and perhaps the others), depends on whether or not the epigastric furrow is open; a conical projection at the rear of the anterior portion of the female genitalia apparently inserts into a conical invagination at the front of the posterior portion, when the furrow is closed (see fig. 131).

They described a second species as "*Heteroonops (?) colombi* n. sp." (Dumitresco and Georgesco, 1983: 90, pl. 14, figs. 1, 2). Again, they had a single female, from the Cueva Cinco Cuevas in La Habana province. That female is missing both pedipalps, and hence its generic placement remains debatable. They presented only a ventral view of the female genitalia, which do not closely resemble those of any of the species of *Heteroonops* known to us. The identity and placement of this species will remain enigmatic until topotypical specimens become available for study.

Finally, those authors (Dumitesco and Gerogesco, 1983: 81, pl. 10, figs. 1–7) assigned to *Oonops castellus* Chickering three specimens from two widely separated Cuban localities. They noted some discrepancies between their specimens and those described from the Virgin Islands by Chickering, but concluded that the differences did not justify the establishment of a new species for any of the Cuban specimens. Their illustrations suggest that these Cuban specimens may belong to *Heteroonops*, but they also leave little doubt that they do not belong to *H. castellus*. Here again, the generic and specific placement of these specimens will remain indeterminate until topotypical material can be obtained for study.



Figs. 169–175. *Heteroonops andros*, new species, female. **169.** Carapace, dorsal view. **170.** Habitus, ventral view. **171.** Same, lateral view. **172.** Carapace and palp, anterior view. **173.** Epigastric region, ventral view. **174.** Genitalia, ventral view. **175.** Same, dorsal view.



Figs. 176–184. *Heteroonops spinigata*, new species, female. **176.** Habitus, dorsal view. **177.** Same, ventral view. **178.** Same, lateral view. **179.** Carapace and palp, dorsal view. **180.** Same, anterior view. **181.** Palp, prolateral view. **182.** Epigastric region, ventral view. **183.** Genitalia, ventral view. **184.** Same, dorsal view.

Heteroonops spinigata, new species

Figures 176–184

TYPE: Female holotype taken in a dung trap at an elev. of 4200 ft at Hardwar Gap, St. Andrew Par., Jamaica (Jan. 5–10, 1973; S., J. Peck), deposited in AMNH (PBI_OON 1854).

ETYMOLOGY: The specific name is an arbitrary combination of letters.

DIAGNOSIS: Females can easily be recognized by the series of strong ventral spines on the palpal tarsus (fig. 181) and the heart-shaped posterior receptaculum (figs. 183, 184).

MALE: Unknown.

FEMALE (PBI_OON 26892, figs. 176–181): Total length 1.56. Palp patella not prolaterally dilated. Abdominal venter without pair of subcuticular dark spots. Leg spination: femora: I, II d1-0-0; III d1-0-0; IV d0-0-1; tibiae: III p1-1-0; IV p1-0-1, v0-0-1, r1-0-1; metatarsi: I, II v0-1-0; IV p0-0-1, v1-0-0. Palpal spination: femur v1-1-0, patella p1-0-1, tibia p2-2-2, v1-0-0, tarsus p2-2-0, v2-2-1. Anterior receptaculum short, on narrow stalk; posterior receptaculum heart shaped, outlined by wide ducts (figs. 182–184).

OTHER MATERIAL EXAMINED: GREATER ANTILLES: **JAMAICA:** *Portland:* Hardwar Gap, Fairy Glade, Mt. Horeb, June 24, 1958 (M. Sanderson, MCZ 71801, PBI_OON 26862), 1♀. *St. Andrew:* Fairy Glade, May 1955 (P. Bellinger, MCZ 71765, PBI_OON 288), 3♀; Hermitage Reservoir, Nov. 26, 1957 (A. Chickering, MCZ 71777, PBI_OON 26892), 1♀. *St. Mary:* Strawberry Fields, near Robin's Bay and Green Castle, Mar. 28, 1972, sifting forest litter (H., L., F. Levi, MCZ PBI_OON 28134), 1♀. *St. Thomas:* 6 mi NE Bath, Dec. 10, 1957 (A. Chickering, MCZ 71790, PBI_OON 287), 1♀.

DISTRIBUTION: Jamaica.

Heteroonops vega, new species

Figures 185–211

TYPES: Male holotype and female allotype taken in forest litter at an elevation of 800 m at Salto Jimenoa, 7 km SE Jarabacoa, La Vega Province, Dominican Republic (July 31, 1995; S., J. Peck), deposited in AMNH (PBI_OON 21092).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the extremely long embolus (figs. 193–196) and the elongated fangs (figs. 189, 190), females by the stong ventral spination on leg I (four pairs of long spines on the tibia, two pairs on the metatarsus) and by the long, extremely narrow anterior receptaculum (figs. 209–211).

MALE (PBI_OON 21092, figs. 185–189): Total length 1.53. Endites each with one posteriorly directed projection (figs. 190–192, 197–202). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I, II d1-0-0; III, IV d1-0-1; tibiae: I v2-2-0; III d0-1-0, p0-0-1, v0-1-0, r0-0-1; IV d0-1-0, p0-1-1, v0-1-0, r0-1-1; metatarsi: III v0-1-2, r0-0-1; IV p1-0-1, v0-1-2, r1-0-1. Embolus extremely elongated, extending back more than full length of bulb, conductor translucent, arched, with denticles (figs. 193–196).

FEMALE (PBI_OON 21092, figs. 203–208): Total length 1.62. Palpal patella not prolaterally dilated. Leg spination: femora: II d1-0-0; III, IV d0-0-1; tibiae: I v4-2-2; II v3-2-2; III p1-0-0, v1-1-0; metatarsi: I, II v2-2-0; III v1-0-1, r1-1-0; IV v0-1-0. Palpal spination: femur v0-1-1, patella p0-1-1, tibia p2-1-2, tarsus p1-1-0. Anterior receptaculum narrow throughout its length; posterior receptaculum short, wide (figs. 209–211).

OTHER MATERIAL EXAMINED: GREATER ANTILLES: **Hispaniola:** *Dominican Republic:* El Seíbo: Miches, June 22, 2008, cacao farm (V. Ovtsharenko, AMNH PBI_OON 301), 1♂, 1♀.

DISTRIBUTION: Hispaniola.

Heteroonops iviei, new species

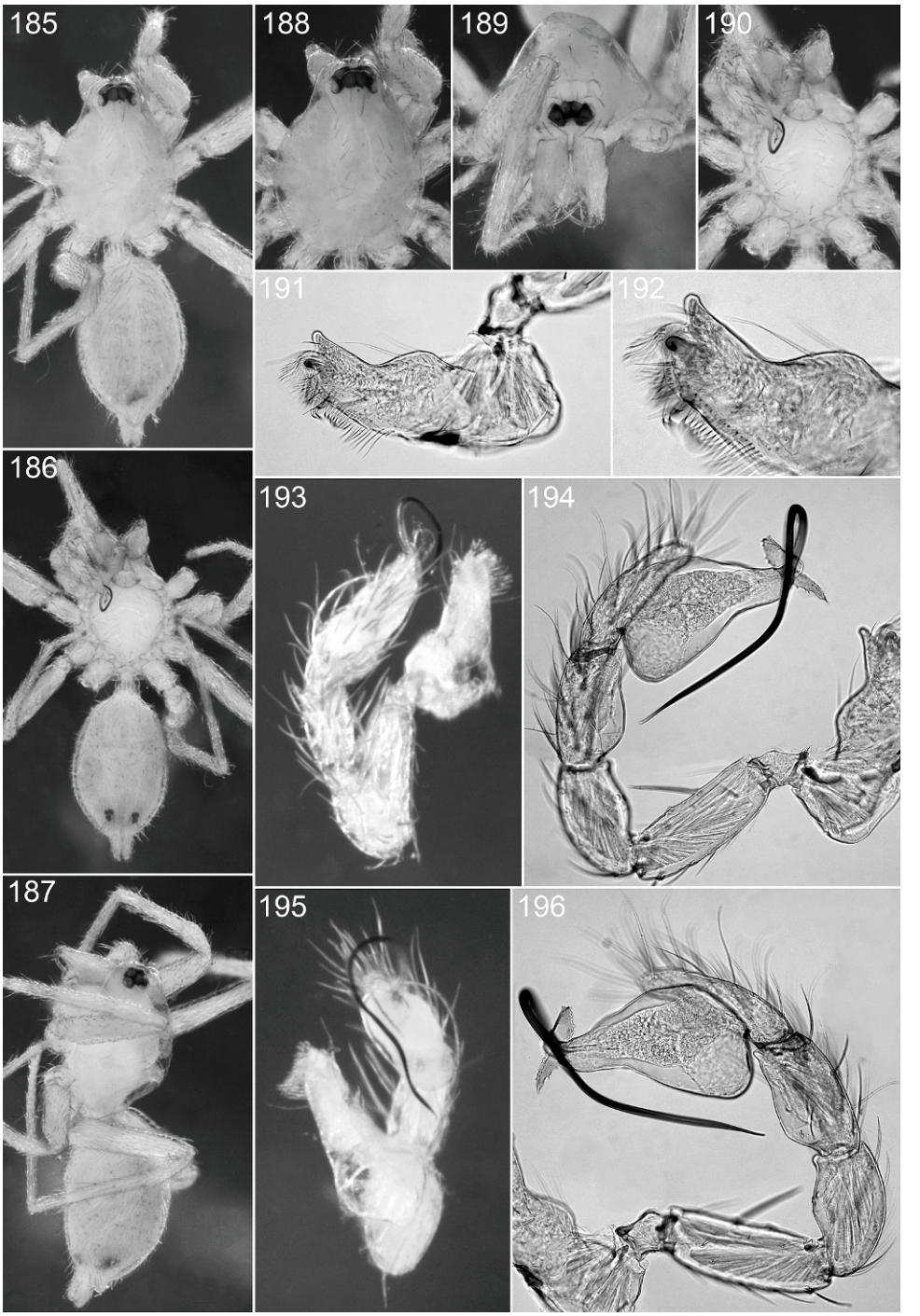
Figures 212–221

TYPES: Male holotype and male paratype taken in a flight intercept trap at an elevation of 1250 m at Las Abejas, ca. 35 km N of Cabo Rojo, Pedernales Province, Dominican Republic (Aug. 26–Sept. 9, 1988; M. Ivie, Philips, Johnson), deposited in USNM (2046648, PBI_OON 27817).

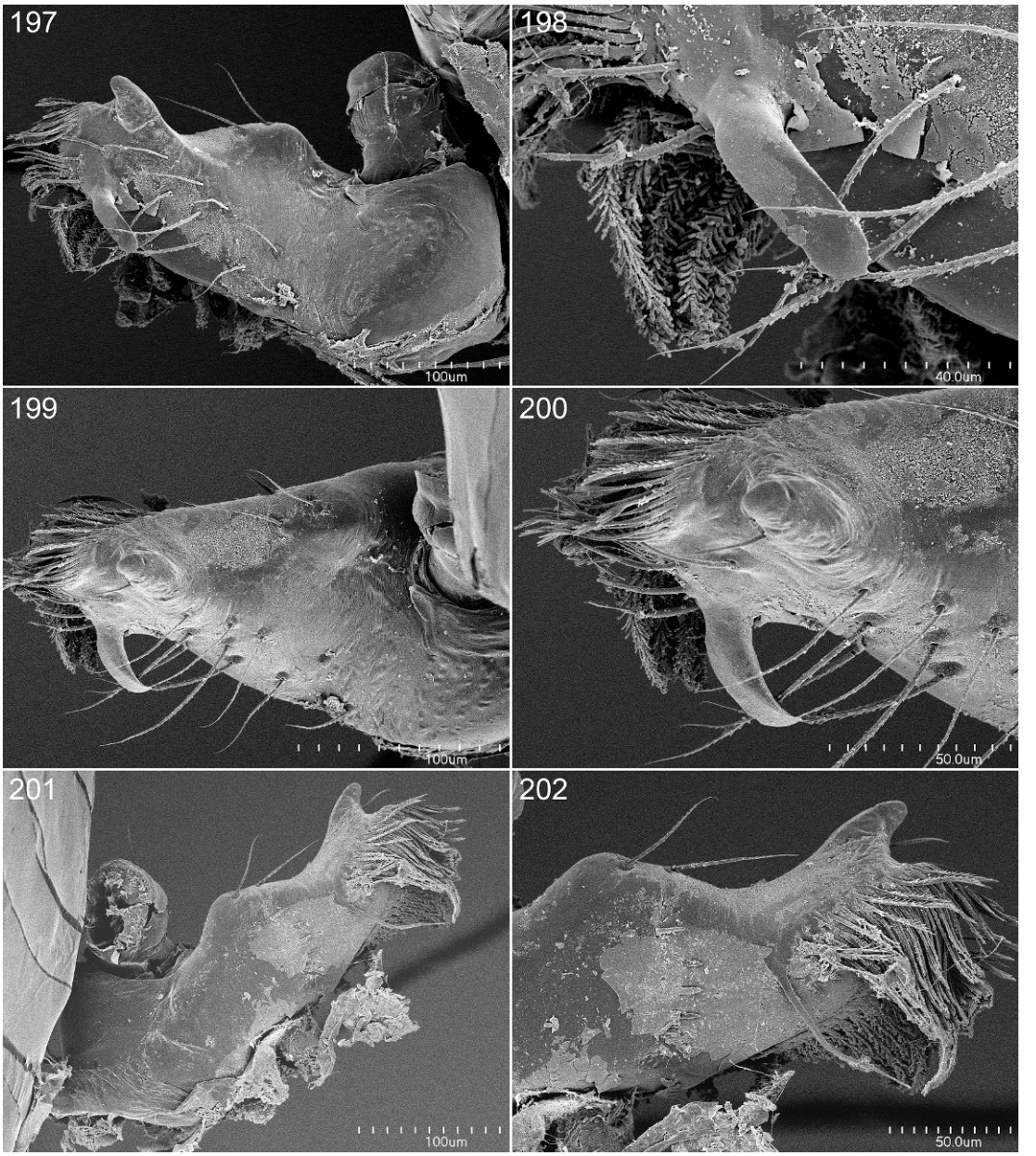
ETYMOLOGY: The specific name is a patronym in honor of Michael Ivie, one of the collectors of the types.

DIAGNOSIS: Males can be recognized by the long sclerotization extending posteriorly from the base of the endite projection (figs. 217–219) and by the short, triangular palpal conductor (figs. 220, 221).

MALE (PBI_OON 27817, figs. 212–216): Total length 1.55. Endites each with one posteriorly directed projection. (figs. 217–



Figs. 185–196. *Heteroonops vega*, new species, male. **185.** Habitus, dorsal view. **186.** Same, ventral view. **187.** Same, lateral view. **188.** Carapace, dorsal view. **189.** Same, anterior view. **190.** Cephalothorax, ventral view. **191.** Endite, ventral view. **192.** Endite tip, same. **193.** Palp, dorsal view. **194.** Same, prolateral view. **195.** Same, ventral view. **196.** Same, retrolateral view.



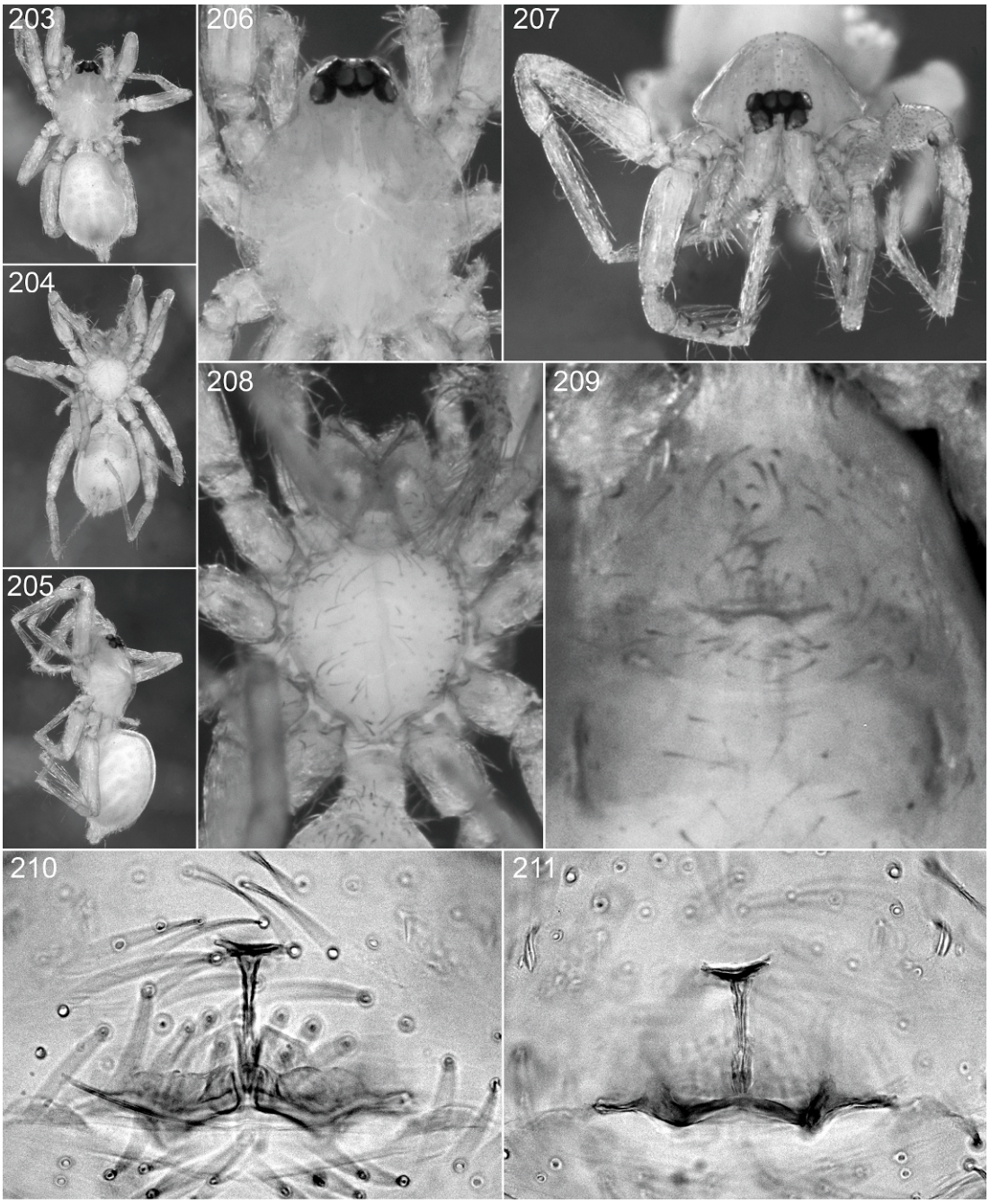
Figs. 197–202. *Heteroonops vega*, new species, male endite. **197.** Ventral view. **198.** Tip, same. **199.** Retrolateral view. **200.** Tip, same. **201.** Dorsal view. **202.** Tip, same.

219) Abdominal venter with pair of subcuticular slightly darkened spots just anterior of spinnerets. Leg spination: femora: I, II d1-0-0; III, IV d1-0-0; tibiae: I v2-2-0; III v0-0-1; IV v0-1-0; metatarsi: I v2-2-0; II v0-1-0; III r1-1-0; IV v0-1-0. Embolus relatively short, arched, conductor short, triangular (figs. 220, 221).

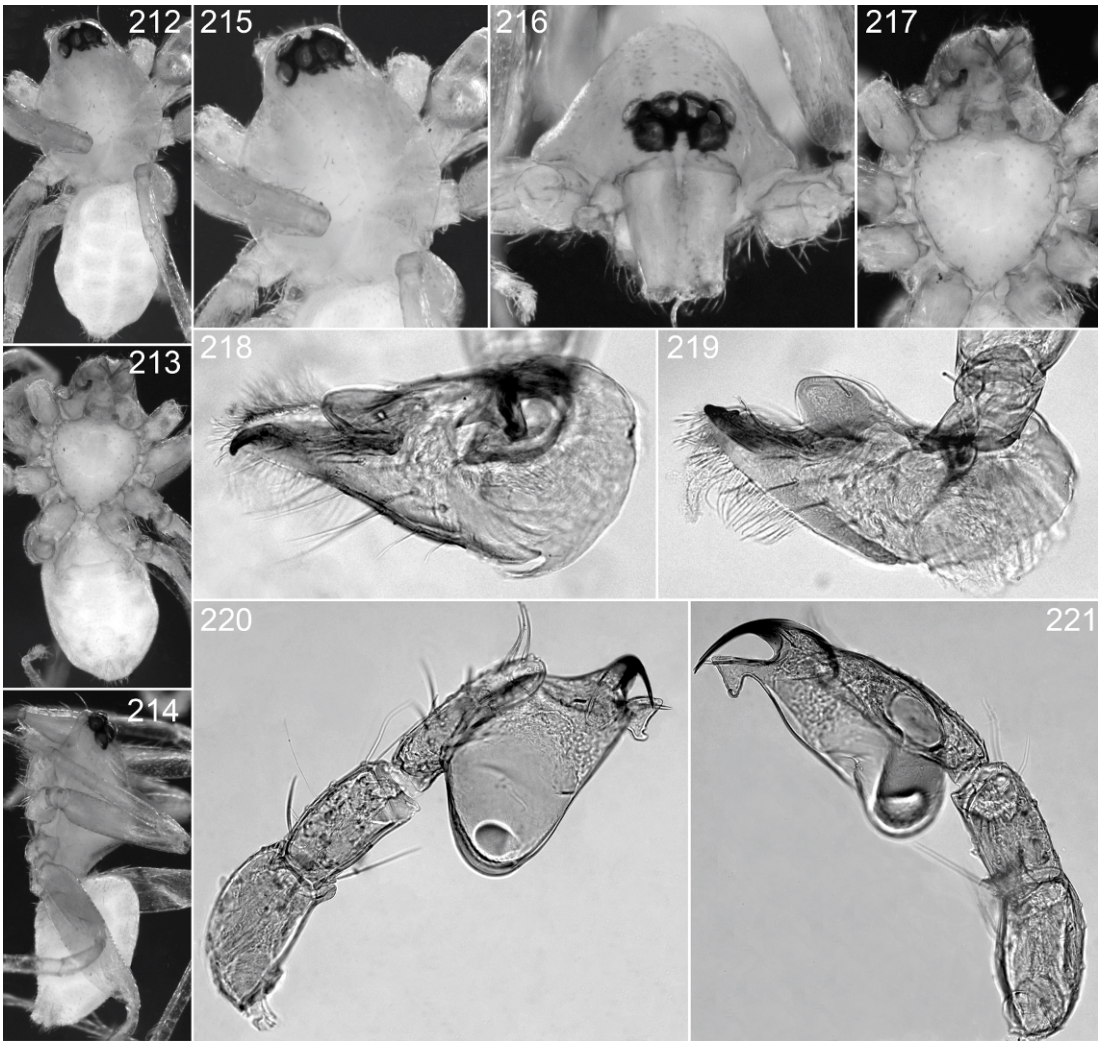
FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Hispaniola.



Figs. 203–211. *Heteroonops vega*, new species, female. **203.** Habitus, dorsal view. **204.** Same, ventral view. **205.** Same, lateral view. **206.** Carapace and palp, dorsal view. **207.** Same, anterior view. **208.** Cephalothorax, ventral view. **209.** Epigastric region, ventral view. **210.** Genitalia, ventral view. **211.** Same, dorsal view.



Figs. 212–221. *Heteroonops iviei*, new species, male. **212.** Habitus, dorsal view. **213.** Same, ventral view. **214.** Same, lateral view. **215.** Carapace, dorsal view. **216.** Same, anterior view. **217.** Cephalothorax, ventral view. **218.** Endite, retrolateral view. **219.** Same, ventral view. **220.** Palp, prolateral view. **221.** Same, retrolateral view.

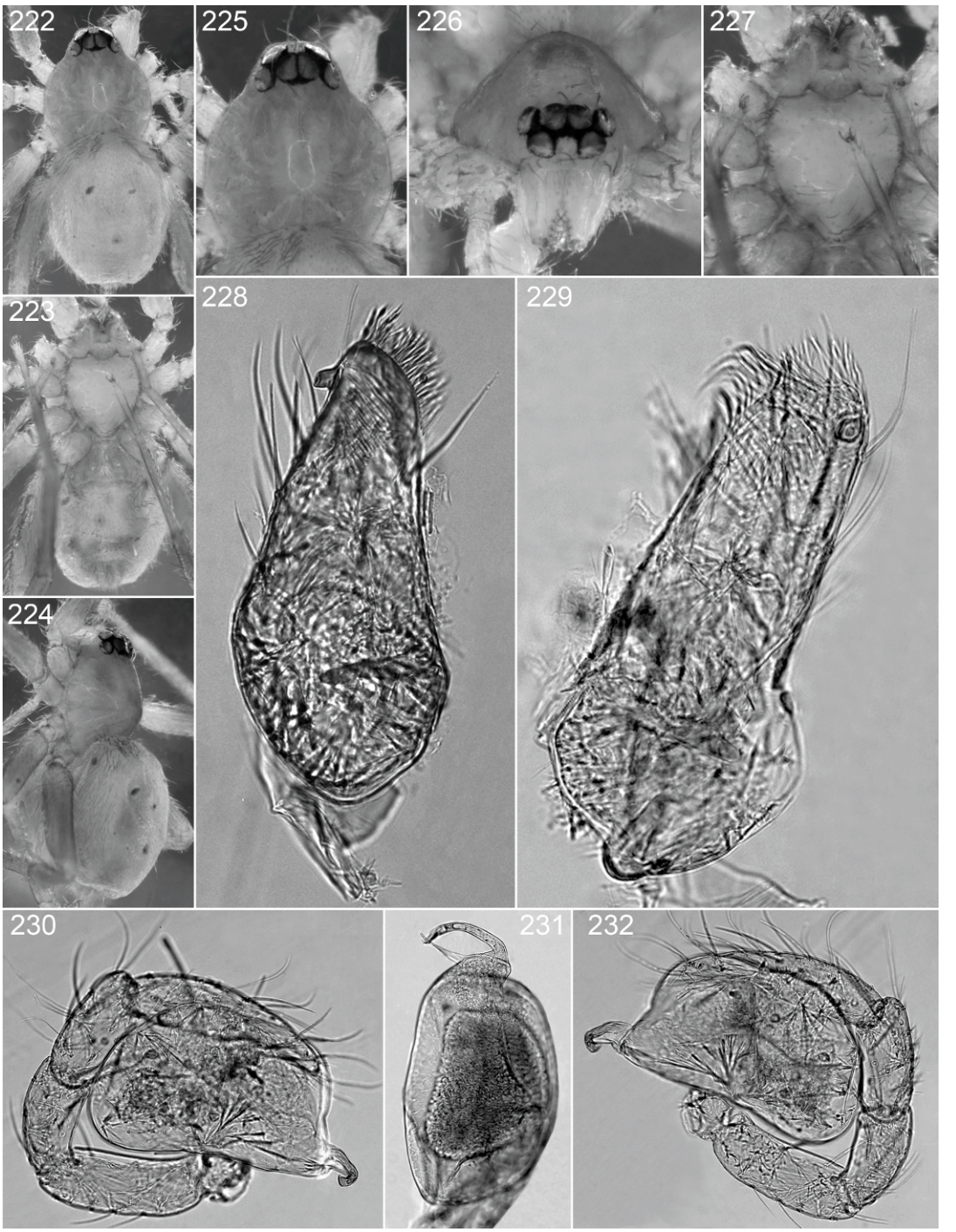
Heteroonops validus (Bryant), new combination

Figures 222–241

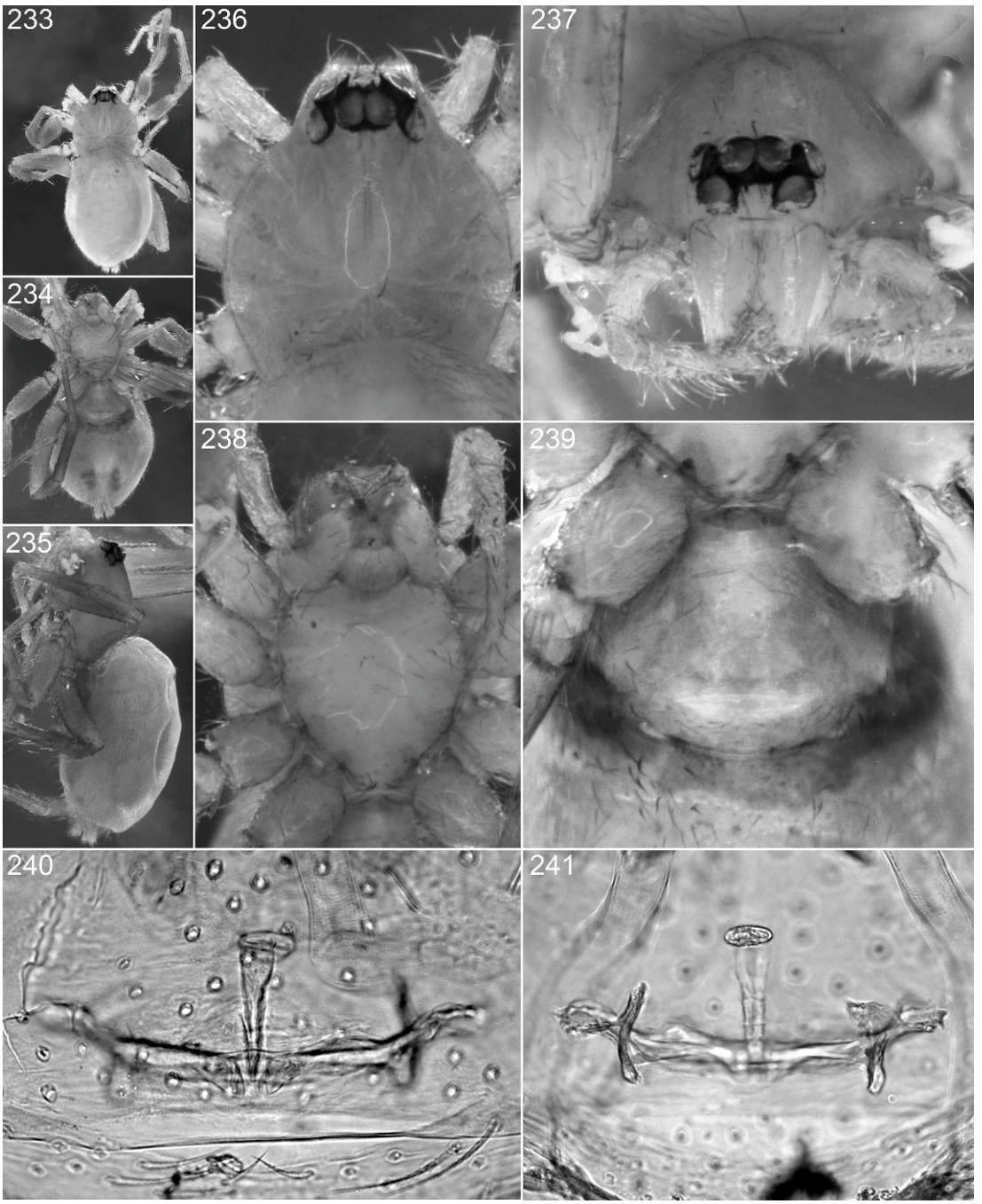
Oonops validus Bryant, 1948: 341, fig. 3 (male holotype from Loma Rucilla Mountains, Dominican Republic, in MCZ; examined). – Chickering, 1972: 114, figs. 22, 23.

DIAGNOSIS: Males can be recognized by the anteriorly expanded palpal bulb (figs. 230–232); females resemble those of *H. vega* but have an anteriorly wider longitudinal bar in the anterior receptaculum (figs. 239–241).

MALE (PBI_OON 21091, figs. 222–226): Total length 1.46. Endites each with one posteriorly directed projection (figs. 227–229). Abdominal venter without pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: III d0-0-1; IV d1-0-1; tibiae: I v3-3-0; II v0-2-2; III v0-0-1; IV v0-1-1; metatarsi: I, II v1-0-1; III v0-0-1; IV p0-0-1, v1-



Figs. 222–232. *Heteroonops validus* (Bryant), male. **222.** Habitus, dorsal view. **223.** Same, ventral view. **224.** Same, lateral view. **225.** Carapace, dorsal view. **226.** Same, anterior view. **227.** Cephalothorax, ventral view. **228.** Endite, retrolateral view. **229.** Same, ventral view. **230.** Palp, prolateral view. **231.** Same, ventral view. **232.** Same, retrolateral view.



Figs. 233–241. *Heteroonops validus* (Bryant), female. **233.** Habitus, dorsal view. **234.** Same, ventral view. **235.** Same, lateral view. **236.** Carapace, dorsal view. **237.** Same, anterior view. **238.** Cephalothorax, ventral view. **239.** Epigastric region, ventral view. **240.** Genitalia, ventral view. **241.** Same, dorsal view.

0-0. Bulb as large distally as proximally, with strongly bent embolus and straight, translucent conductor (figs. 230–232).

FEMALE (PBI_OON 21091, figs. 233–238): Total length 1.54. Palpal patella not prolaterally dilated. Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: III d0-0-1; IV d1-0-1; tibiae: I v3-3-0; II v4-2-0; III p0-0-1, v1-0-1; IV v1-0-1; metatarsi: I v2-2-0; II v2-0-2; III v0-1-1; IV v1-0-1. Palpal spination: femur v0-0-1, patella p0-1-1, tibia pp1-1-2, tarsus p1-0-0, v2-0-2. Anterior receptaculum long, gradually expanded anteriorly, with transverse bar only slightly wider than longitudinal bar (figs. 239–241).

MATERIAL EXAMINED: GREATER ANTILLES: **Hispaniola:** *Dominican Republic:* Cordillera Central: Loma Rucilla Mountains, June 1938, elev. 5000–8000 ft (P. Darlington, MCZ PBI_OON 302), 1♂ (holotype). La Vega: Parque Nacional A. Bermudez, Cienaga, July 19–Aug. 2, 1995, flight intercept trap in tropical evergreen forest, elev. 1020 m (S., J. Peck, AMNH PBI_OON 21091), 3♂, 2♀.

DISTRIBUTION: Hispaniola.

Heteroonops castelloides, new species

Figures 242–259

TYPE: Male holotype taken in a flight intercept trap at an elevation of 1100 m in a tropical evergreen forest in the Parque Nacional A. Bermudez, Cienaga, La Vega, Dominican Republic (July 19–Aug. 2, 1995; S., J. Peck), deposited in AMNH (PBI_OON 21069).

ETYMOLOGY: The specific name refers to the similarities of this species to *H. castellus* (Chickering).

DIAGNOSIS: Males resemble those of *H. castellus* but have a shorter, basally thicker embolus (figs. 249, 250); females resemble those of *H. castellus* in having a solid, compact posterior receptaculum but have a much longer, more elaborate anterior receptaculum (figs. 257–259).

MALE (PBI_OON 21095, figs. 242–246): Total length 1.72. Endites each with one posteriorly directed projection (figs. 247, 248). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I d1-0-0; II d1-0-1; III, IV d1-0-1; tibiae: III d0-1-0, p1-0-1, v0-0-1, r0-0-1; IV d0-1-0, p1-0-1, v0-1-2, r0-0-1; metatarsi: III v1-0-2; IV d1-0-0, p1-0-0, v0-0-2, r1-0-0. Embolus basally thickened, then abruptly bent, conductor straight, translucent (figs. 249, 250).

FEMALE (PBI_OON 21095, figs. 251–256): Total length 1.98. Palpal patella elongated but not prolaterally dilated. Leg spination: femora: III d1-0-0; IV d1-0-1, p0-0-1; tibiae: I v0-0-1; III p1-0-1, r1-0-0; IV v0-1-0; metatarsi: I v0-2-2; III v0-1-0; IV v0-1-1. Palpal spination: femur v1-1-1, patella p1-1-0, tibia 2-2-3, v0-1-1, tarsus p1-1-1, v1-1-1. Anterior receptaculum with five branches; posterior receptaculum compact (figs. 257–259).

OTHER MATERIAL EXAMINED: GREATER ANTILLES: **Hispaniola:** *Dominican Republic:* La Vega: Parque Nacional A. Bermudez, Cienaga, July 19–Aug. 2, 1995, flight intercept trap, tropical evergreen forest, elev. 1000 m (S., J. Peck, AMNH PBI_OON 21095), 1♂, 3♀.

DISTRIBUTION: Hispaniola.

Heteroonops castellus (Chickering), new combination

Figures 260–353

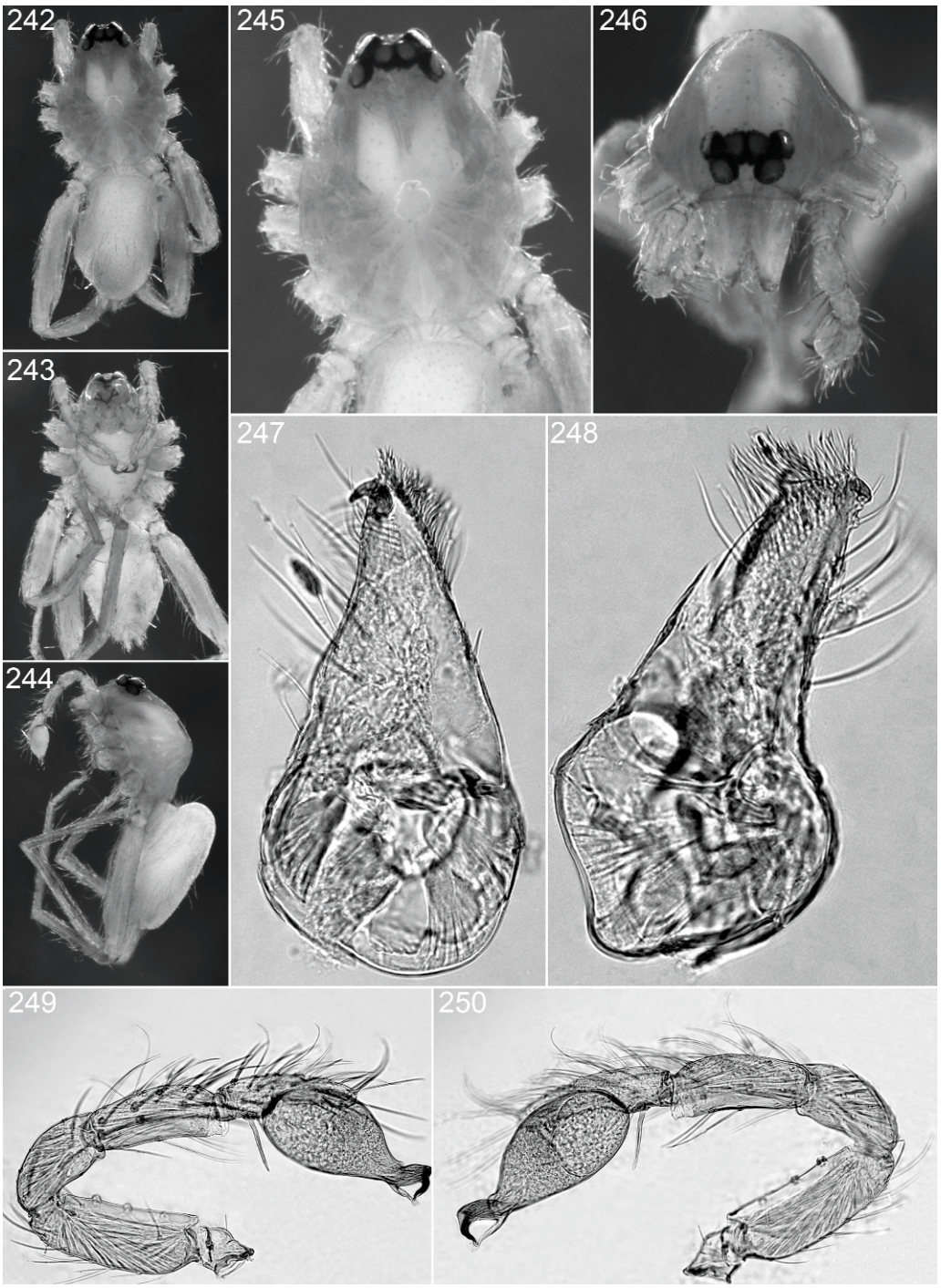
Oonops spinimanus (misidentification): Petrunkevitch, 1929: 67, figs. 53–57.

Oonops castellus Chickering, 1971: 206, figs. 12–16, 18–20 (male holotype from E side, Charlotte Amalie, St. Thomas, Virgin Islands, in MCZ; examined).

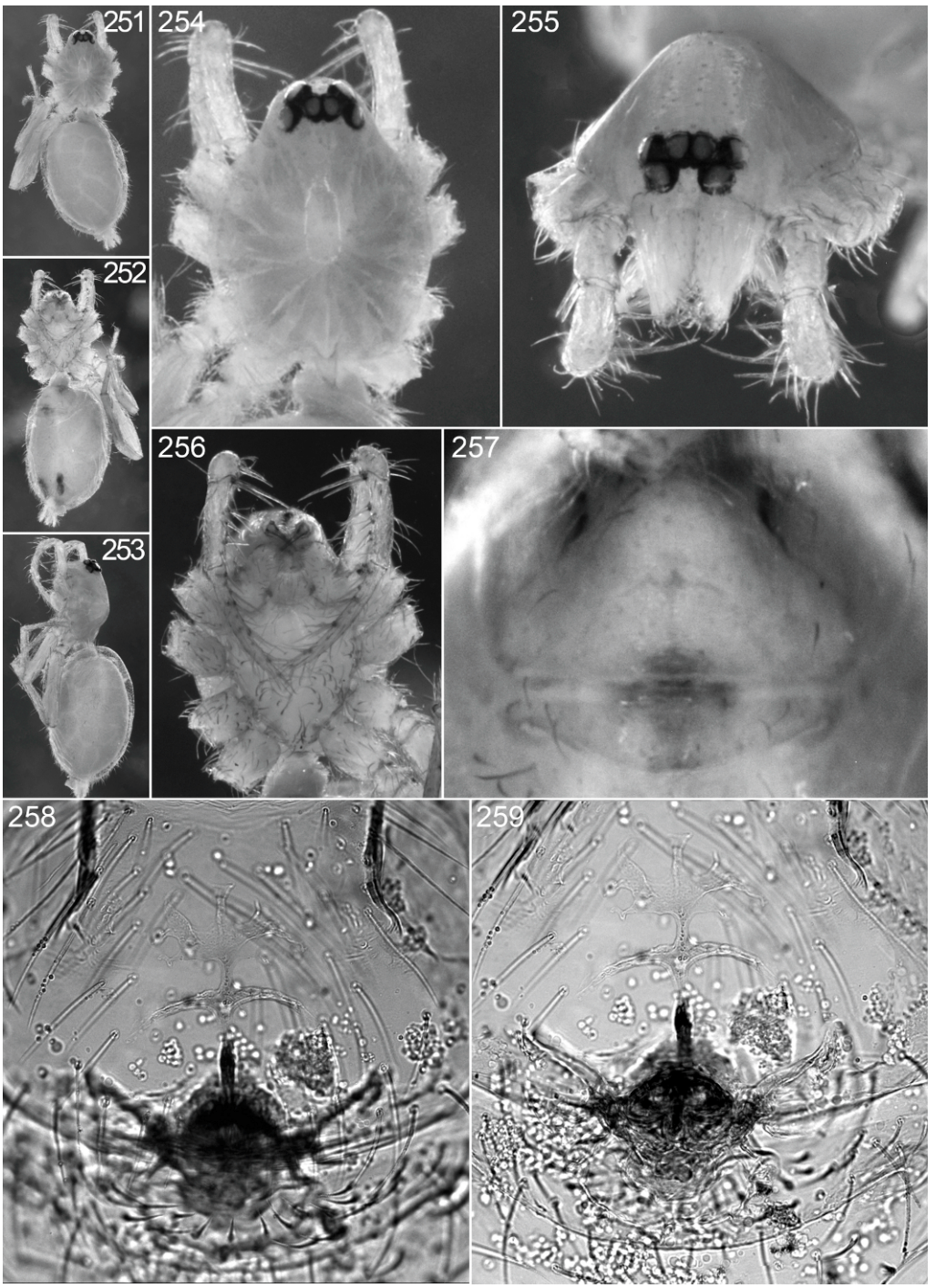
Oonops delegenus Chickering, 1972: 106, figs. 6–10 (female holotype from University campus, Mayagüez, Puerto Rico, in MCZ; examined). NEW SYNONYMY.

DIAGNOSIS: Males have the pars cephalica elevated at the rear, with two large ovoid pale patches (figs. 260, 262), and a long, distally twisted embolus (figs. 267, 268); females have the distal end of the anterior receptaculum directed dorsally (figs. 305–311).

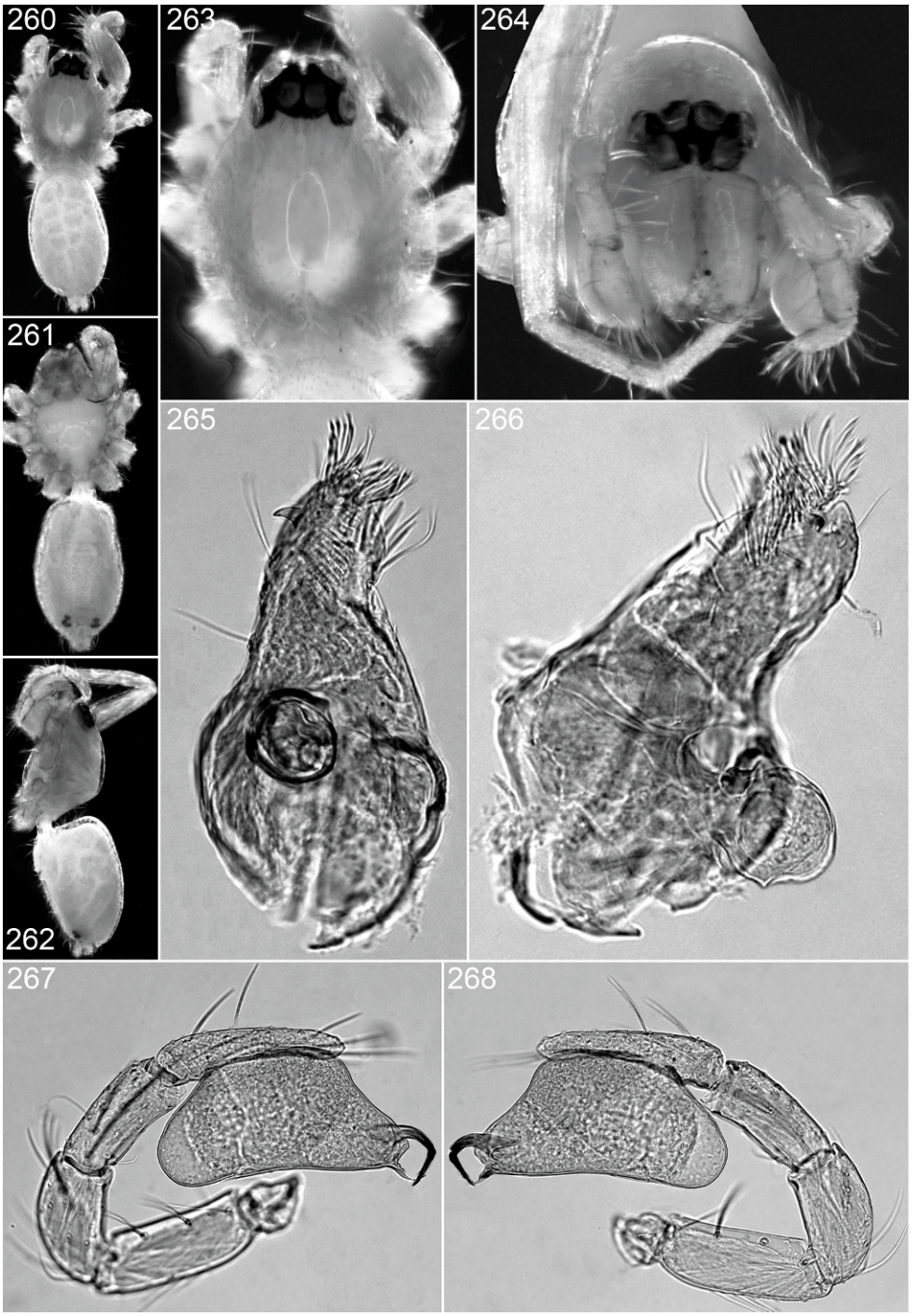
MALE (PBI_OON 28079, figs. 260–264): Total length 1.68. Endites each with one posteriorly directed projection (figs. 265, 266). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: tibiae: I v2-2-0; III, IV p0-0-1, v2-0-2; metatarsi: I, II v2-2-0; III v2-0-2; IV p1-0-1, v1-0-2. Embolus bent at base, subdistally flared, conductor short, twisted (figs. 267, 268).



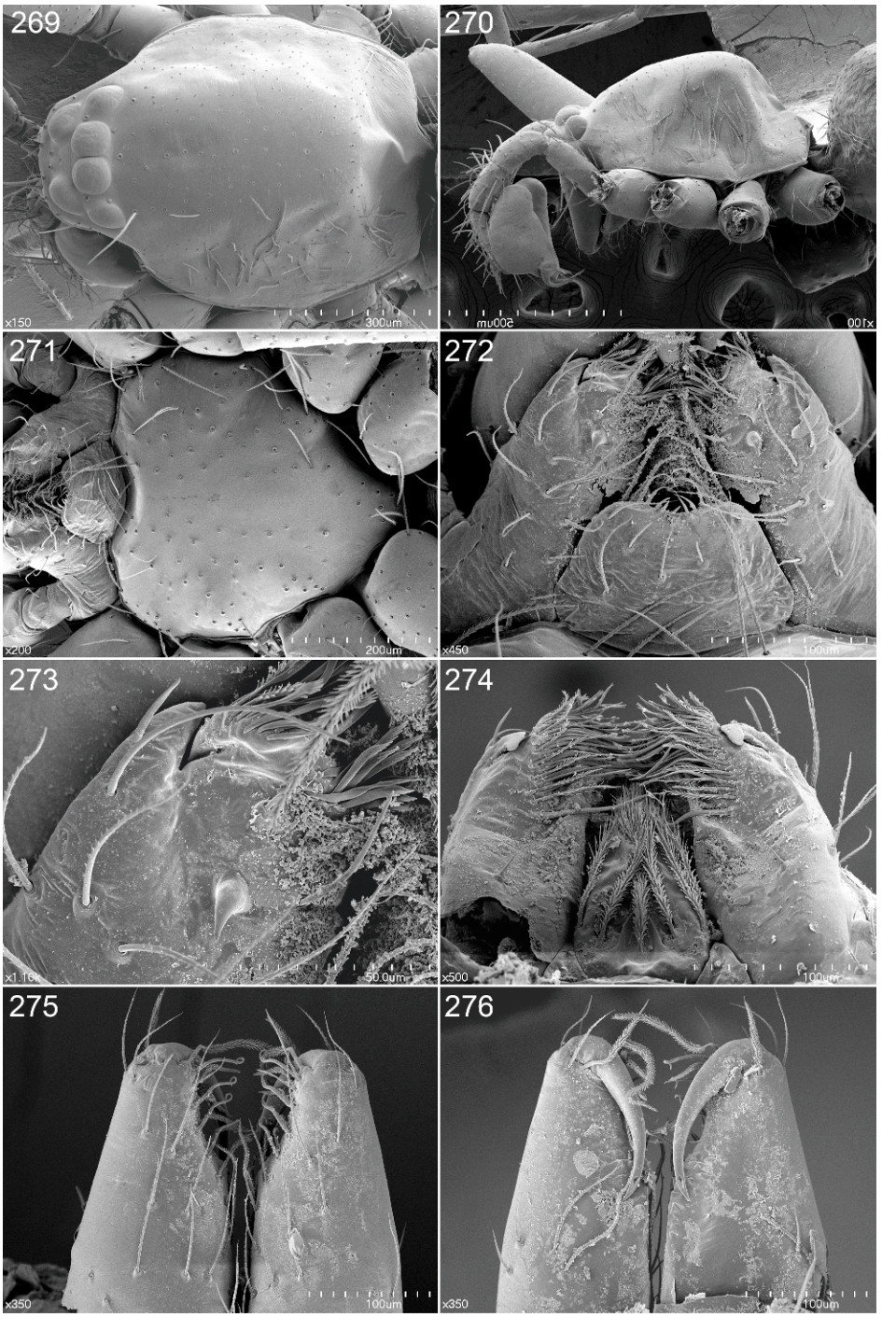
Figs. 242–250. *Heteroonops castelloides*, new species, male. **242.** Habitus, dorsal view. **243.** Same, ventral view. **244.** Same, lateral view. **245.** Carapace, dorsal view. **246.** Same, anterior view. **247.** Endite, retrolateral view. **248.** Same, ventral view. **249.** Palp, prolateral view. **250.** Same, retrolateral view.



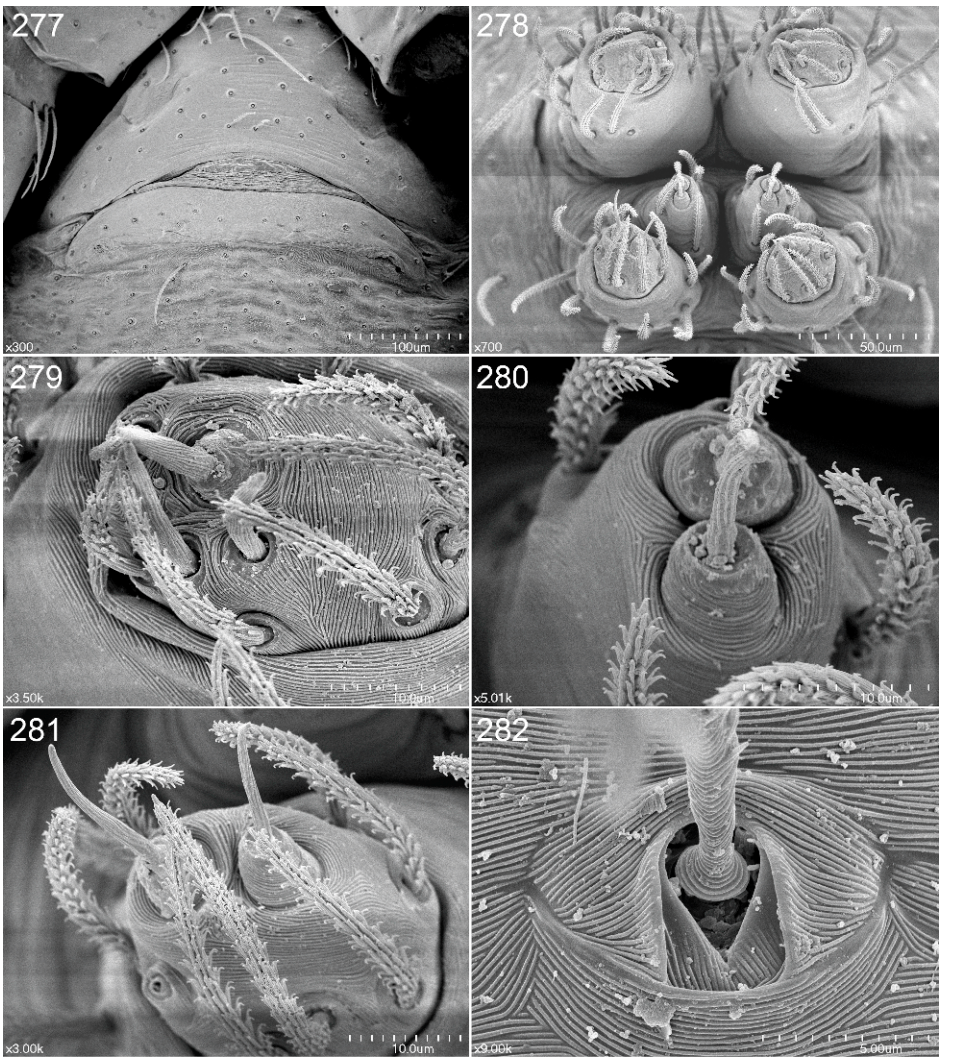
Figs. 251–259. *Heteroonops castelloides*, new species, female. **251.** Habitus, dorsal view. **252.** Same, ventral view. **253.** Same, lateral view. **254.** Carapace and palps, dorsal view. **255.** Same, anterior view. **256.** Cephalothorax, ventral view. **257.** Epigastric region, ventral view. **258.** Genitalia, ventral view. **259.** Same, dorsal view.



Figs. 260–268. *Heteroonops castellus* (Chickering), male. **260.** Habitus, dorsal view. **261.** Same, ventral view. **262.** Same, lateral view. **263.** Carapace, dorsal view. **264.** Same, anterior view. **265.** Endite, retrolateral view. **266.** Same, ventral view. **267.** Palp, prolateral view. **268.** Same, retrolateral view.



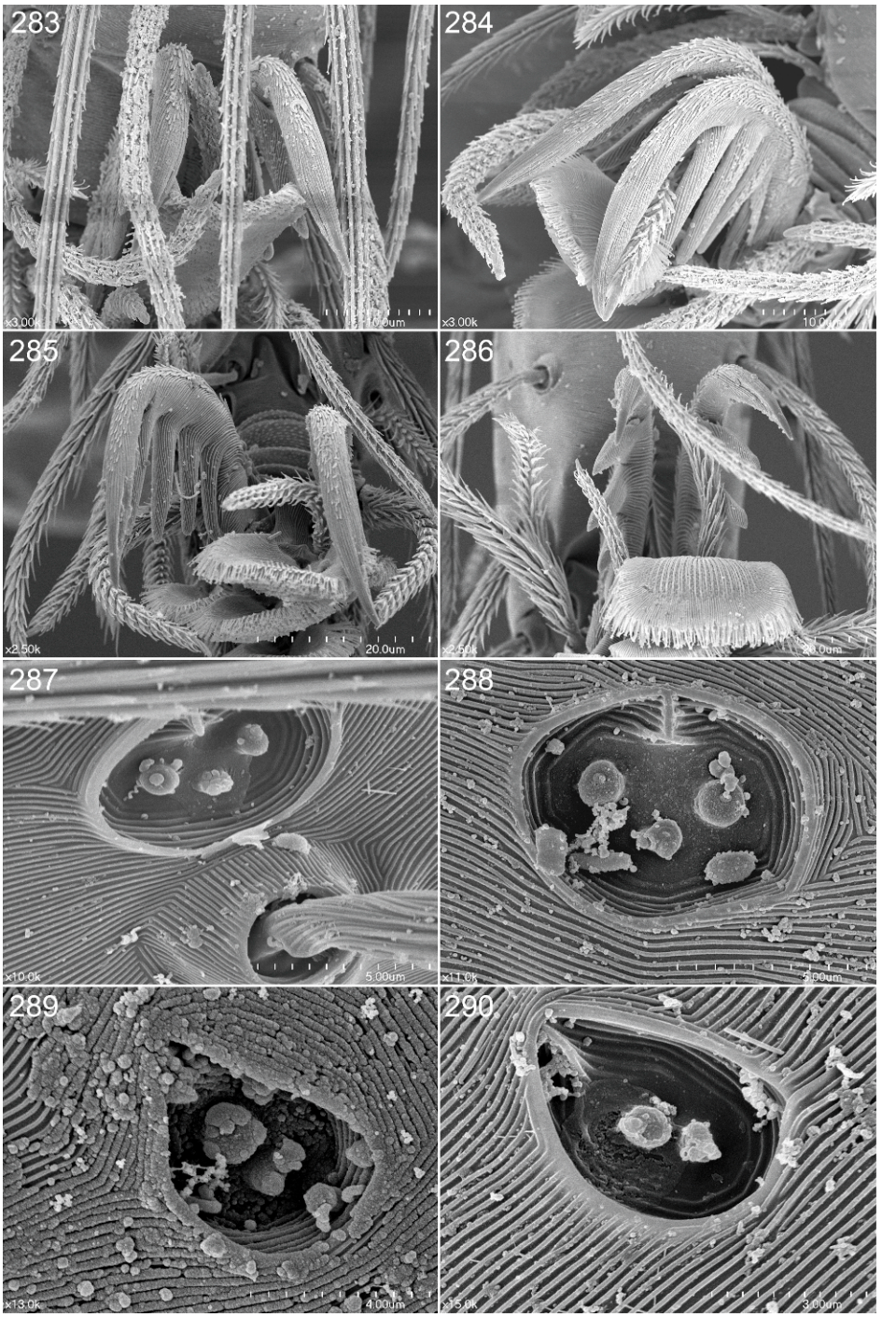
Figs. 269–276. *Heteroonops castellus* (Chickering), male. **269.** Carapace, dorsal view. **270.** Same, lateral view. **271.** Cephalothorax, ventral view. **272.** Labium and endites, ventral view. **273.** Tip of endite, ventral view. **274.** Labrum and endites, anterior view. **275.** Chelicerae, anterior view. **276.** Same, posterior view.



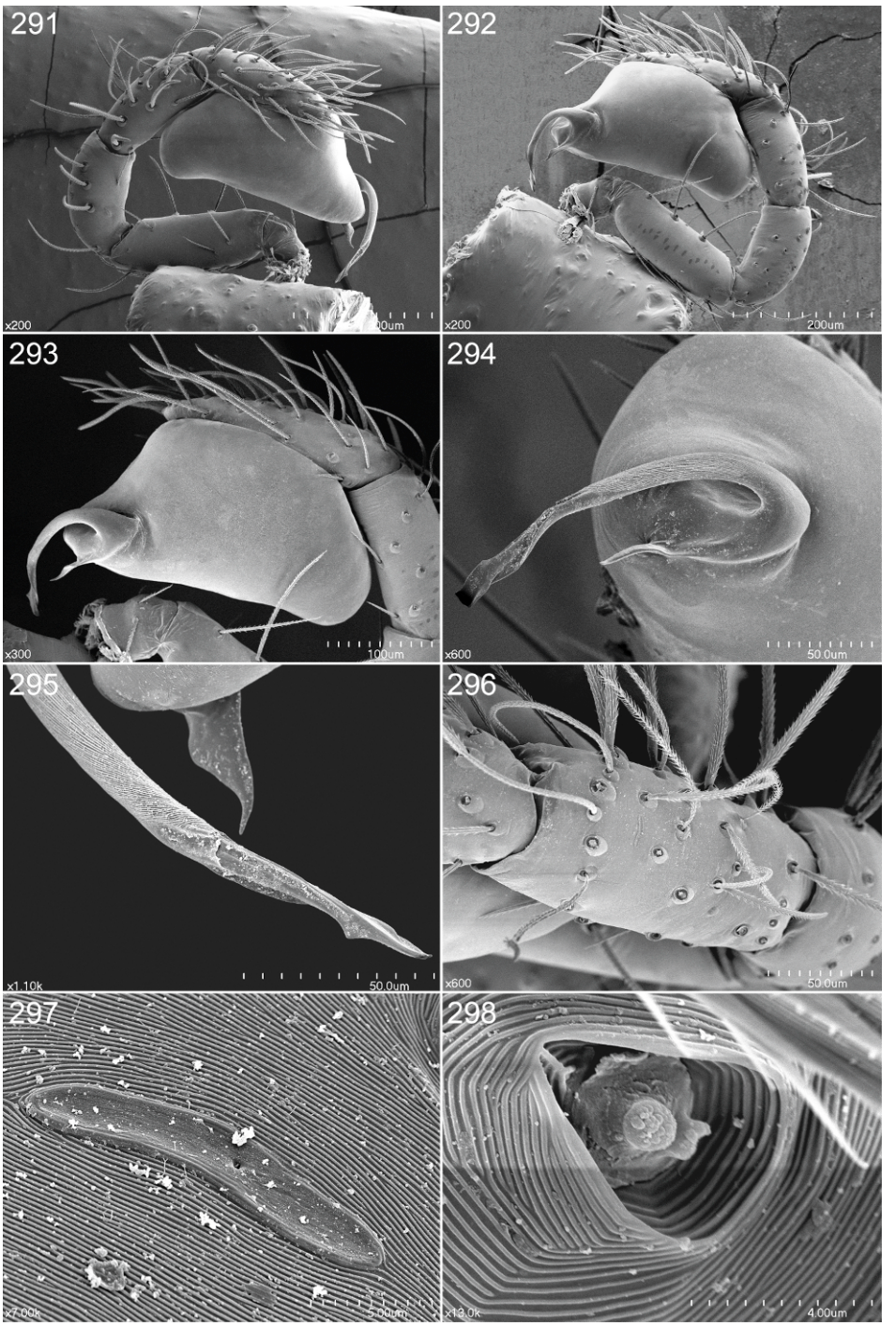
Figs. 277–282. *Heteroonops castellus* (Chickering), male. **277.** Epigastric region, ventral view. **278.** Spinnerets, posterior view. **279.** Anterior lateral spinneret, same. **280.** Posterior median spinneret, same. **281.** Posterior lateral spinneret, same. **282.** Trichobothrial base from metatarsus III, dorsal view.

FEMALE (PBI_OON 28075, figs. 299–304): Total length 1.98. Palpal patella not prolaterally dilated. Leg spination: tibiae: I v4-4-0; II v2-2-0; III p0-1-1, v0-1-0; IV p0-1-1, v0-1-1; metatarsi: I, II v2-2-0; III v0-1-0; IV p0-1-1, v0-1-0. Palpal spination: femur v0-1-1, patella p1-1-0, tibia p1-1-1, tarsus p1-2-2, v1-2-2. Anterior receptaculum terminating in knob-shaped, dorsally directed expansion; posterior receptaculum shaped like inverted heart (figs. 305–311).

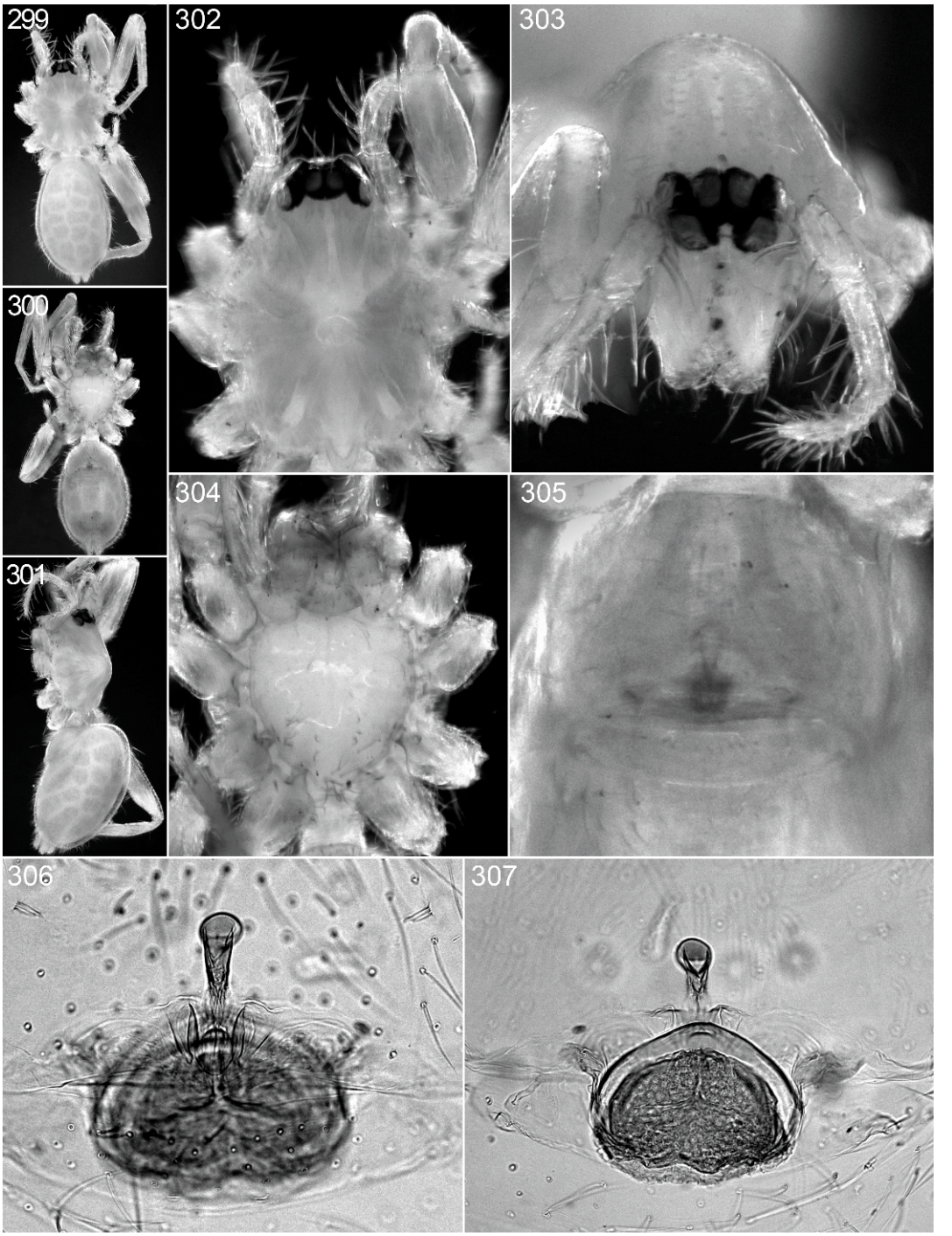
MATERIAL EXAMINED: GREATER ANTILLES: **Puerto Rico:** Mayagüez, Feb. 21–22, 1955 (A. Nadler, AMNH PBI_OON 21078), 1♀, Mar. 11, 1959 (A. Nadler, AMNH PBI_OON 21083), 1♀; Mayagüez, University campus, Jan. 11, 1964 (MCZ PBI_OON 26733), 1♀ (holotype), Jan. 20, 1964 (A. Chickering, MCZ 71597, PBI_OON 28102), 1♂, same (A. Chickering, MCZ 66759, PBI_OON 37503), 1♀; 5 km from Mayagüez on Rt. 106, Jan. 30, 1964 (A. Chickering,



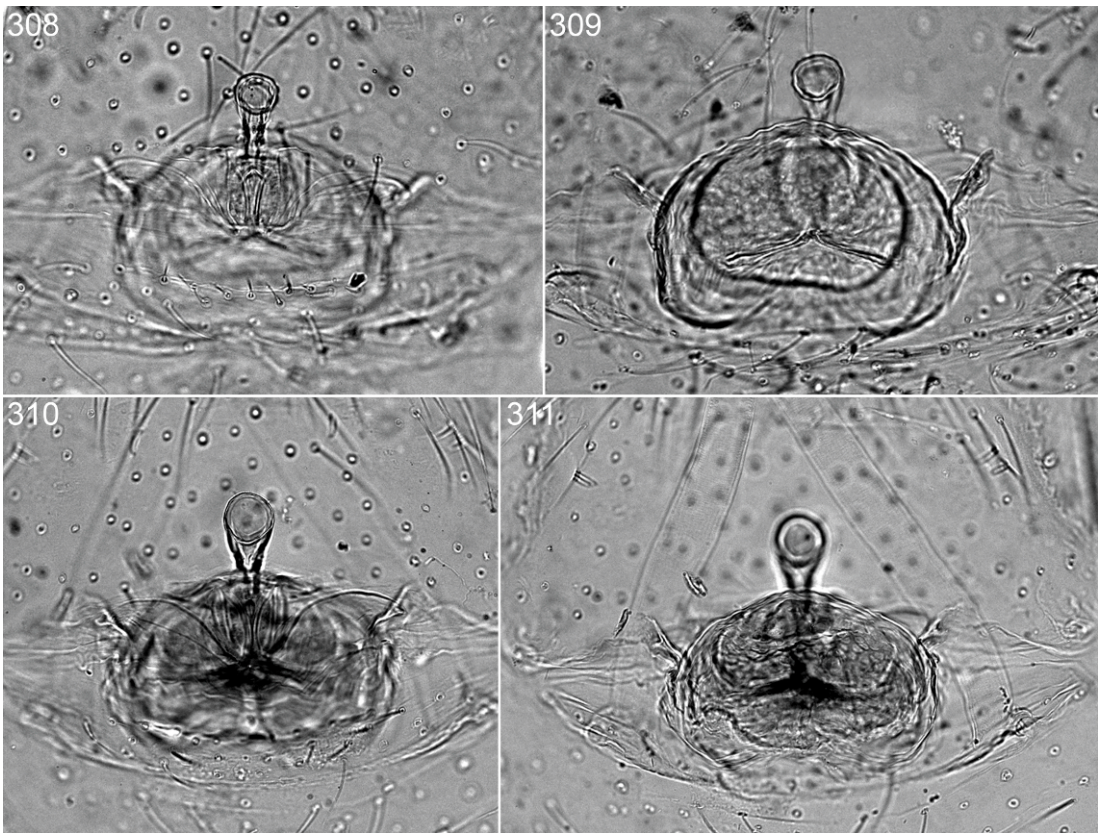
Figs. 283–290. *Heteroonops castellus* (Chickering), male. **283.** Claws of leg I, distal view. **284.** Claws of leg II, lateral view. **285.** Claws of leg III, distal view. **286.** Claws of leg IV, distal view. **287.** Tarsal organ, leg I, dorsal view. **288.** Same, leg II. **289.** Same, leg III. **290.** Same, leg IV.



Figs. 291–298. *Heteroonops castellus* (Chickering), male palp. **291.** Prolateral view. **292.** Retrolateral view. **293.** Bulb, retrolateral view. **294.** Embolus and conductor, ventral view. **295.** Same, prolateral view. **296.** Tibia, dorsal view. **297.** Platelet and pore on tibia, dorsal view. **298.** Tarsal organ, dorsal view.

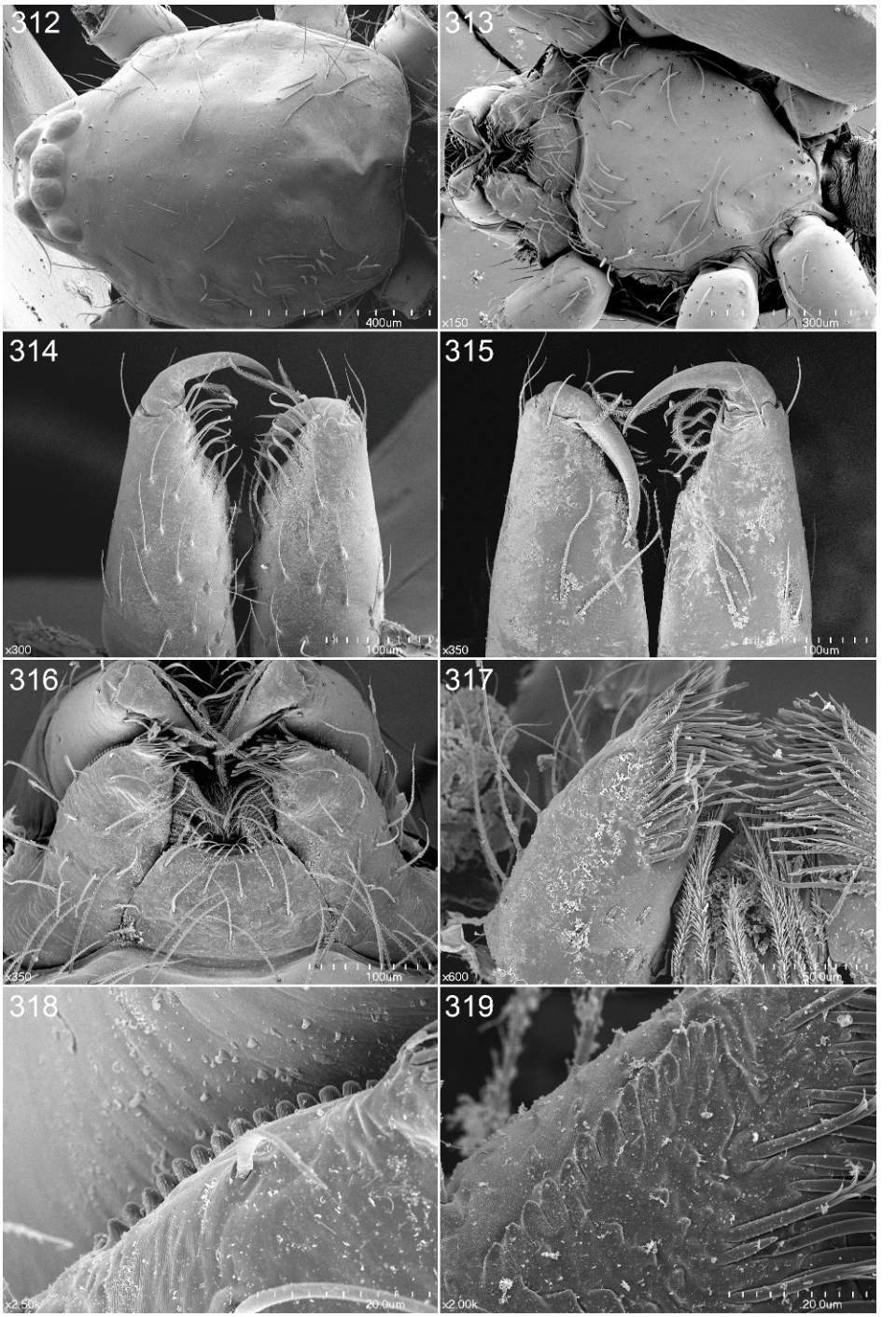


Figs. 299–307. *Heteroonops castellus* (Chickering), female. **299.** Habitus, dorsal view. **300.** Same, ventral view. **301.** Same, lateral view. **302.** Carapace and palps, dorsal view. **303.** Same, anterior view. **304.** Cephalothorax, ventral view. **305.** Epigastric region, ventral view. **306.** Genitalia, ventral view. **307.** Same, dorsal view.

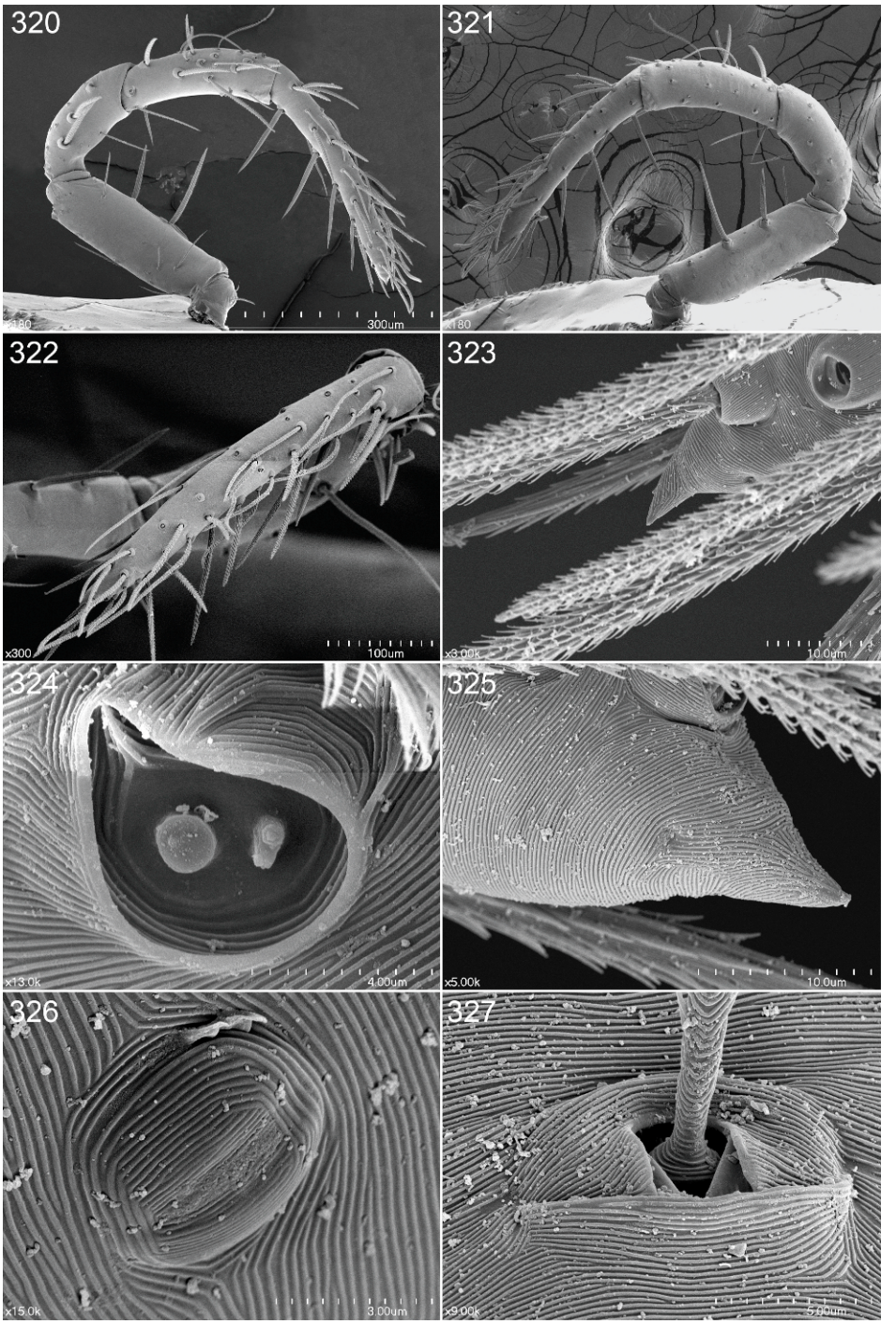


Figs. 308–311. *Heteroonops castellus* (Chickering), female genitalia. **308.** Holotype of *Oonops delegenus* Chickering, ventral view. **309.** Same, dorsal view. **310.** Another female from Puerto Rico, ventral view. **311.** Same, dorsal view.

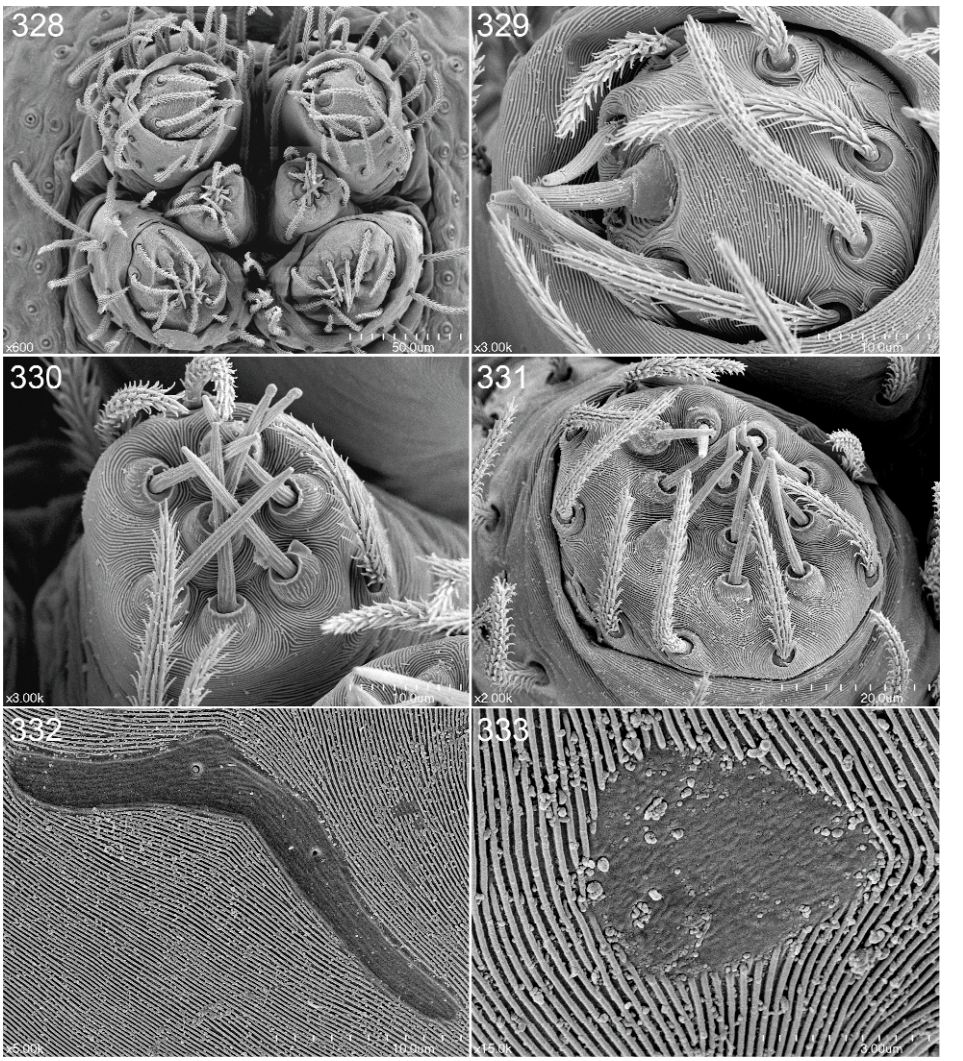
MCZ 66758, PBI_OON 1841), 1♀; Montañas de Urojan, Dt. 108, km 12–22, Jan. 12, 1964 (A. Chickering, MCZ 66760, PBI_OON 1837), 1♀; Naranjito, June–July, sifting (AMNH PBI_OON 1939), 1♂ (without palps, identity established by endite structure); Río Piedras, Humacao Co., Mar. 2, 1955 (A. Nadler, AMNH PBI_OON 1840), 2♂, 1♀; University farm, E of Nuclear Center, Jan. 18, 1964 (A. Chickering, MCZ 66757, PBI_OON 36751), 1♀. LESSER ANTILLES: **Virgin Islands:** *St. John:* no specific locality, Mar. 6–7, 1964 (A. Chickering, MCZ 71591, PBI_OON 28078), 1♂, 3♀, July 23–25, 1966 (A. Chickering, MCZ 66768, PBI_OON 28095), 16♂, 16♀; Annaberg Ruins, Mar. 5, 1964 (A. Chickering, MCZ 71592, PBI_OON 28093), 2♂, 2♀; Bordeaux Ridge Road, Mar. 27, 1970, sifting forest leaf litter (H., F. Levi, MCZ 71593, PBI_OON 28096), 3♂, 1♀; Centerline Road, 4 mi from Cruz Bay, Mar. 4, 1964 (A. Chickering, MCZ 71632, 71818, PBI_OON 26615, 28072), 4♀; Cruz Bay, Feb. 25, 1964 (A. Chickering, MCZ 71590, PBI_OON 28082), 4♂, 4♀, Feb. 28, 1964 (A. Chickering, MCZ 71631, PBI_OON 28077), 1♂, Mar. 1, 1964 (A. Chickering, MCZ 66750, PBI_OON 28084), 2♂, 4♀. *St. Thomas:* no specific locality, July 13, 1966 (A. Chickering, MCZ 71627, PBI_OON 28091), 1♂, July 15–18, 1966 (A. Chickering, MCZ 71630, PBI_OON 28075), 11♂, 15♀, July 27, 1966 (A. Chickering, MCZ 71604, PBI_OON 28073), 1♂, 2♀, July 27–28, 1966 (A. Chickering, MCZ 71626, PBI_OON 28094), 3♂, 11♀, Aug. 1966 (A. Chickering, MCZ 71821, PBI_OON 38019), 3♀, Aug. 7–13, 1966 (A. Chickering, MCZ 71603, PBI_OON 28079), 6♂, 9♀, Aug. 9, 1966 (A. Chickering, MCZ 66738, 71602, PBI_OON



Figs. 312–319. *Heteroonops castellus* (Chickering), female. **312.** Carapace, dorsal view. **313.** Cephalothorax, ventral view. **314.** Chelicerae, anterior view. **315.** Same, posterior view. **316.** Mouthparts, ventral view. **317.** Labrum and endite, anterior view. **318.** Serrula, anterior view. **319.** Same, distal view.

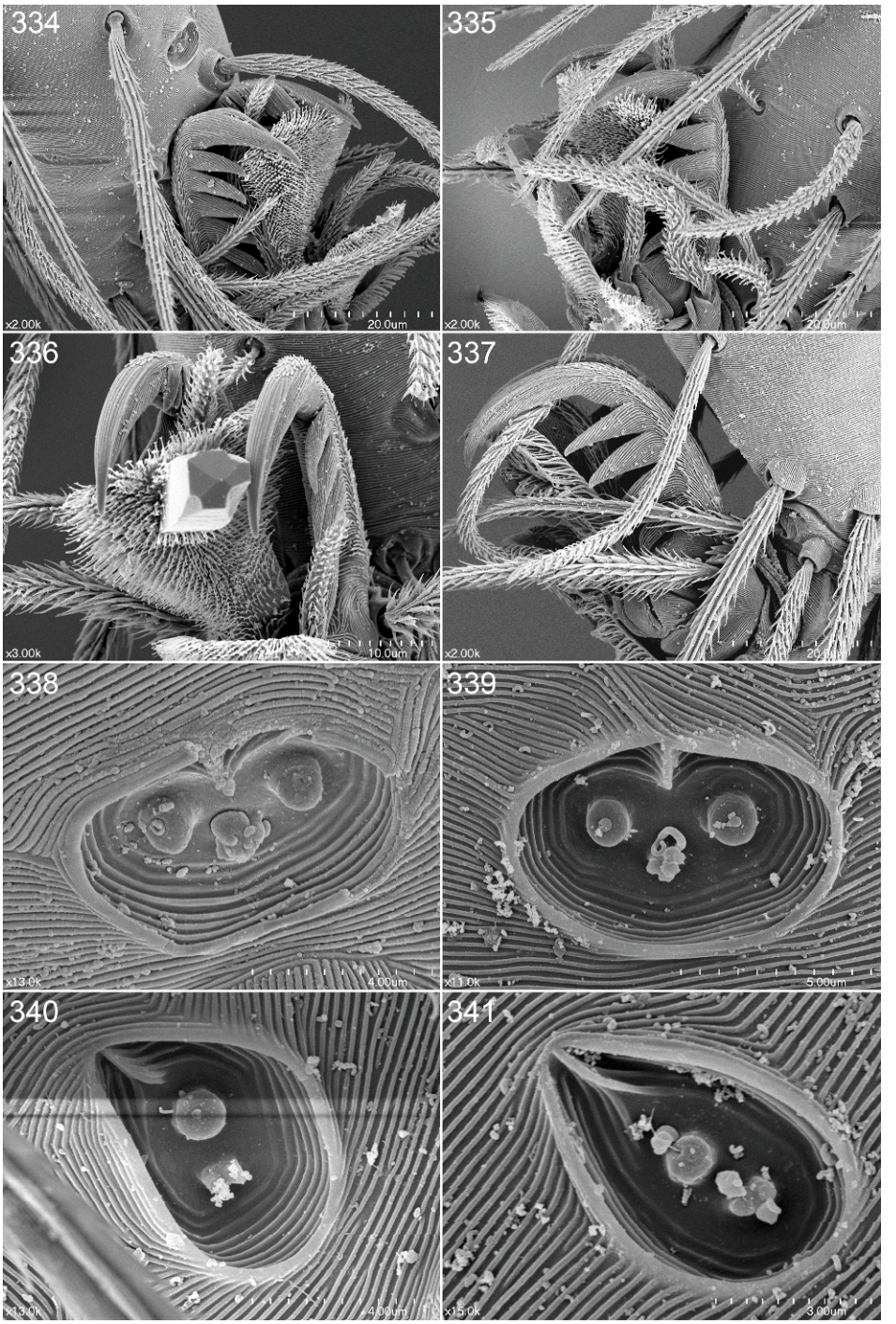


Figs. 320–327. *Heteroonops castellus* (Chickering), female. **320.** Palp, prolateral view. **321.** Same, retrolateral view. **322.** Palpal tarsus, dorsal view. **323.** Tip of palpal tarsus, distal view. **324.** Tarsal organ from palp, dorsal view. **325.** Tip of palpal tarsus, retrolateral view. **326.** Platelet from palpal patella, prolateral view. **327.** Trichobothrial base from metatarsus II, dorsal view.

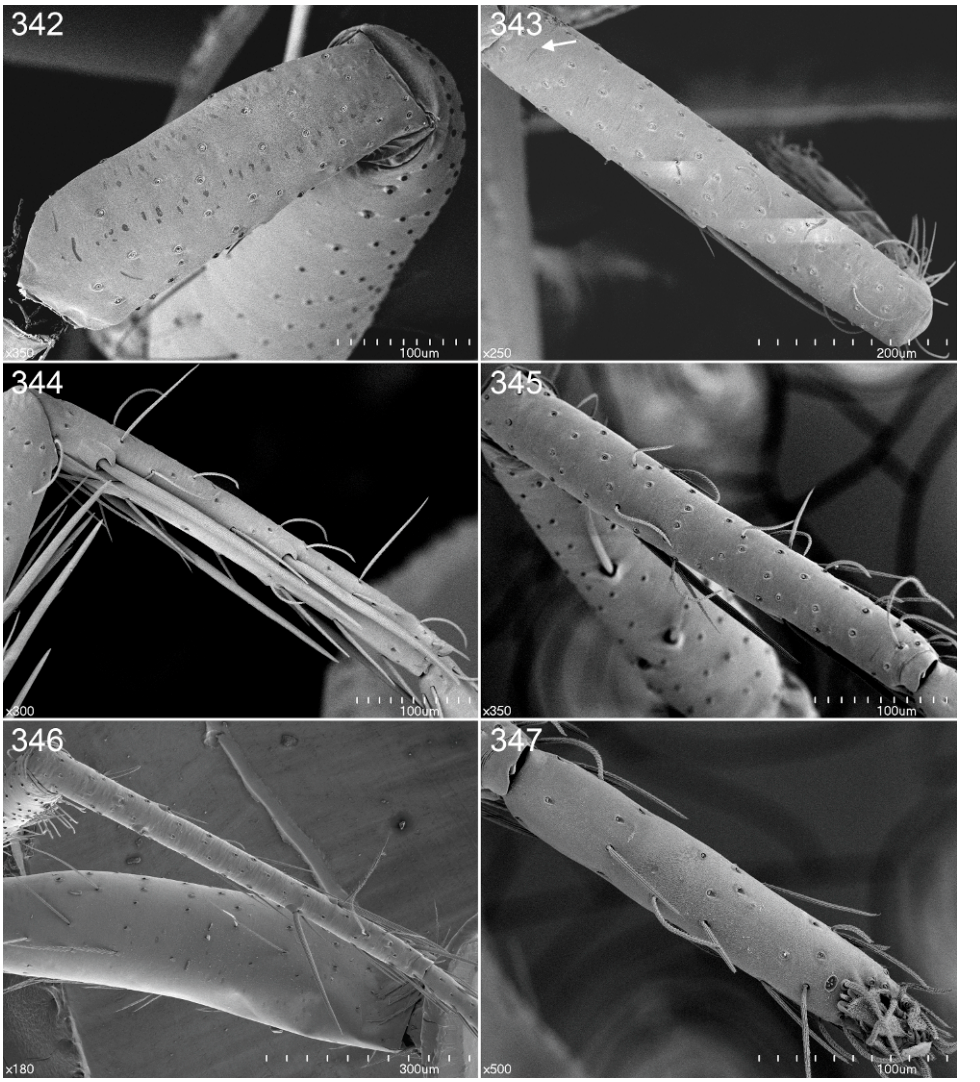


Figs. 328–333. *Heteroonops castellus* (Chickering), female. **328.** Spinnerets, posterior view. **329.** Anterior lateral spinneret, same. **330.** Posterior median spinneret, same. **331.** Posterior lateral spinneret, same. **332.** Platelet with two pores from tibia II, dorsal view. **333.** Platelet without pores from tibia II, dorsal view.

28100, 28103), 7♂, 8♀, Aug. 12, 1966 (A. Chickering, MCZ 71628, PBI_OON 28092), 3♂, 5♀, Aug. 25–29, 1966 (A. Chickering, MCZ 71625, PBI_OON 28070), 4♂, 18♀; Adams Guest House, Charlotte Amalie, Feb. 11, 1964 (A. Chickering, MCZ 71633, PBI_OON 28098), 11♂, 9♀; grounds of Bluebeard's Castle, Charlotte Amalie, Feb. 17–18, 1964 (A. Chickering, MCZ 71601, PBI_OON 28089), 25♂, 24♀; Charlotte Amalie, Feb. 9–10, 1964 (A. Chickering, MCZ 71605, PBI_OON 28097), 17♂, Feb. 9–12, 1964 (A. Chickering, MCZ 71607, PBI_OON 28083), 8♂, 18♀, Feb. 13, 1964, hay and weed debris, vacant lots (A. Chickering, MCZ 72313, PBI_OON 28076), 17♂, 18♀, Feb. 24, 1964, open fields (A. Chickering, MCZ 71634, PBI_OON 28080), 1♂; College Campus, July 16, 1966 (A. Chickering, MCZ 71599, PBI_OON 28074), 1♀; E side, Charlotte Amalie, Feb. 14–16, 1964, vacant lots (A. Chickering, MCZ 71589, PBI_OON 28071), 17♂, 21♀, same (MCZ



Figs. 334–341. *Heteroonops castellus* (Chickering), female. **334.** Claws of leg I, lateral view. **335.** Claws of leg II, same. **336.** Claws of leg III, distal view. **337.** Claws of leg IV, lateral view. **338.** Tarsal organ, leg I, dorsal view. **339.** Same, leg II. **340.** Same, leg III. **341.** Same, leg IV.

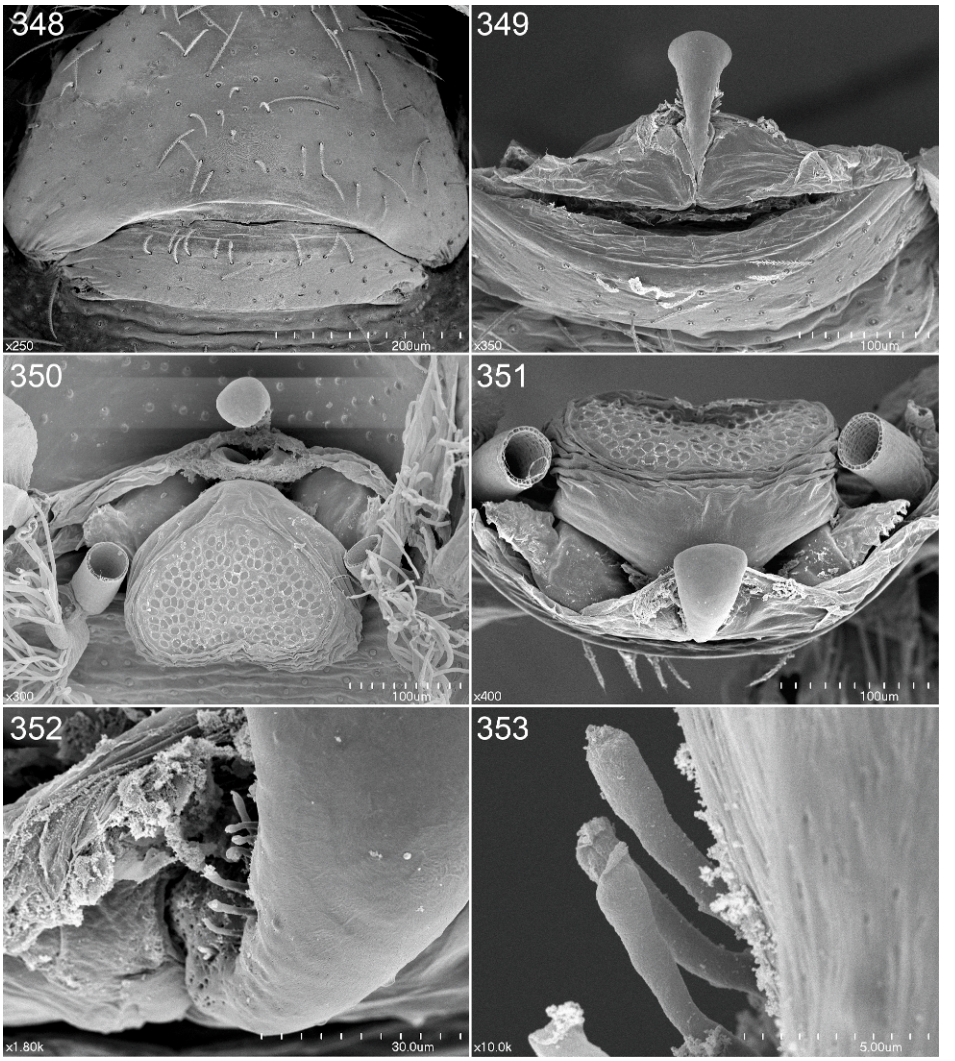


Figs. 342–347. *Heteroonops castellus* (Chickering), female. **342.** Patella II, dorsal view. **343.** Tibia I, dorsal view (arrow points to Emerit's gland platelet). **344.** Metatarsus I, lateral view. **345.** Metatarsus II, dorsal view. **346.** Metatarsus IV, dorsal view. **347.** Tarsus II, dorsal view.

PBI_OON 303), 2♂, 1♀ (holotype, paratypes); Hassel's Island, Feb. 20, 1964 (A. Chickering, MCZ 71608, PBI_OON 28081), 4♂, 3♀; High School Grounds, Charlotte Amalie, Feb. 22, 1964 (A. Chickering, MCZ 71600, PBI_OON 28087), 3♂, 1♀, Mar. 10, 1964 (A. Chickering, MCZ 71629, PBI_OON 28090), 8♂, 1♀, Mar. 10–11, 1964 (A. Chickering, MCZ PBI_OON 10491), 1♀; Rosendal, N side of mountains, Feb. 21, 1964 (A. Chickering, MCZ 71606, PBI_OON 28088), 5♂, 2♀. *Tortola:* no specific locality, July 30–Aug. 5, 1966 (A. Chickering, MCZ 71596, PBI_OON 28099), 2♂, 11♀, Aug. 22, 1966 (A. Chickering, MCZ 72310, 72316, PBI_OON 27435, 28069), 1♂, 1♀.

DISTRIBUTION: Puerto Rico and Virgin Islands (St. John, St. Thomas, and Tortola).

SYNONYMY: Chickering (1972: 108) noted that the female of *O. delegenus* has a palp "with numerous spines on four terminal



Figs. 348–353. *Heteroonops castellus* (Chickering), female. **348.** Epigastric region, ventral view. **349.** Genitalia, ventral view. **350.** Same, dorsal view. **351.** Same, anterior view. **352.** Basal portion of anterior receptaculum, oblique lateral view. **353.** Secretroy glands of anterior receptaculum, same.

segments much like those on *Heteroonops spinimanus* (Simon)'' but nevertheless suggested that the species ''seems to belong in the group of species including *Oonops anoxus* and *Oonops vestus* as described in Part I of this series.'' Even odder is that he correctly identified as *O. castellus* a male he collected at the type locality of *O. delegenus*, which (like the females of *O. delegenus*) fully matches Virgin Island specimens of *O. castellus*, rather than the Panama and Trinidad species he mentioned in the diagnosis of *O. delegenus*.

Heteroonops toro, new species

Figures 354–364

TYPE: Male holotype taken in the Caribbean National Forest, Toro Negro Division, Puerto Rico (Aug. 29, 1967; E. Sabath), deposited in MCZ (71598, PBI_OON 28101).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The male palp closely resembles that of *H. castellus*, but has the tips of the embolus and conductor more widely separated than in that species (figs. 362–364), and the endite projection is longer and differently shaped (figs. 360, 361). The male palp is also remarkably similar to that of *Oonops ebenecus* Chickering, also from Puerto Rico, but males of that species can easily be recognized by their highly modified cheliceral fangs (Chickering, 1972: fig. 12). Males of *O. ebenecus* do have an anterior projection on their endites, but it projects straight out from the endite surface and is not posteriorly directed. It is possible that *O. ebenecus* is the male of *O. viridans* Bryant (1942); both have been collected at El Yunque and at Mayagüez, Puerto Rico, and were taken on the same day at the latter locality. Females of *O. viridans* have genitalia that are very different from those of *Heteroonops* species.

MALE (PBI_OON 28101, figs. 354–358): Total length 1.34. Endites each with one posteriorly directed projection (figs. 359–361). Abdominal venter with pair of subcuticular slightly darkened spots just anterior of spinnerets. Leg spination (legs I, II missing): tibiae: III p0-1-0, v0-1-0, r0-1-0; IV v2-2-0; metatarsi: III d1-0-0, v0-1-0; IV v2-2-0. Embolus smoothly curved, conductor very short, spiniform (figs. 362–364).

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Puerto Rico.

Heteroonops croix, new species

Figures 365–381

Oonops castellus (misidentification): Chickering, 1971: 206, fig. 17 only (males from St. Croix only).

TYPE: Male holotype from Frederiksted, St. Croix, Virgin Islands (Mar. 14, 1964; A. M. Chickering), deposited in MCZ (71594, PBI_OON 28086).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the apically prolonged palpal bulb (figs. 371, 372), females by the relatively heavy sclerotization of the entire epigastric scutum (fig. 379) and the diamond-shaped anterior receptaculum (figs. 380, 381).

MALE (PBI_OON 28085, figs. 365–368): Total length 1.59. Endites each with one posteriorly directed projection (figs. 369, 370). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: femora: I d1-0-0; II d1-0-1; III, IV d1-0-0; tibiae: I v2-2-0; III p1-0-0, v1-0-1, r0-0-1; IV v0-0-1, r1-0-0; metatarsi: I v2-0-2; III v0-1-0, r0-1-0; IV p0-0-1, v1-0-1. Embolus expanded just behind tip, conductor abruptly narrowed near tip (figs. 371, 372).

FEMALE (PBI_OON 27440, figs. 373–378): Total length 1.91. Cheliceral fangs longer than in male. Palpal patella elongated but not prolaterally dilated. Leg spination (leg II missing): tibiae: I v2-4-0; III p0-1-1, v0-0-1; IV v0-1-0; metatarsi: I v2-2-0; III v0-2-2; IV p0-0-1, v1-0-2. Palpal spination: femur v0-0-1, patella p1-1-1, tibia p1-0-0, v0-1-0, tarsus v1-1-2. Anterior receptaculum diamond shaped; posterior receptaculum rectangular, with distinct lumen (figs. 379–381).

OTHER MATERIAL EXAMINED: LESSER ANTILLES: **Virgin Islands:** *St. Croix:* no specific locality, Sept. 6, 1966 (A. Chickering, MCZ 72305, PBI_OON 27440), 1♀; just N Frederiksted, Mar. 16, 1964 (A. Chickering, MCZ 71595, PBI_OON 28085), 1♂.

DISTRIBUTION: Virgin Islands (St. Croix).

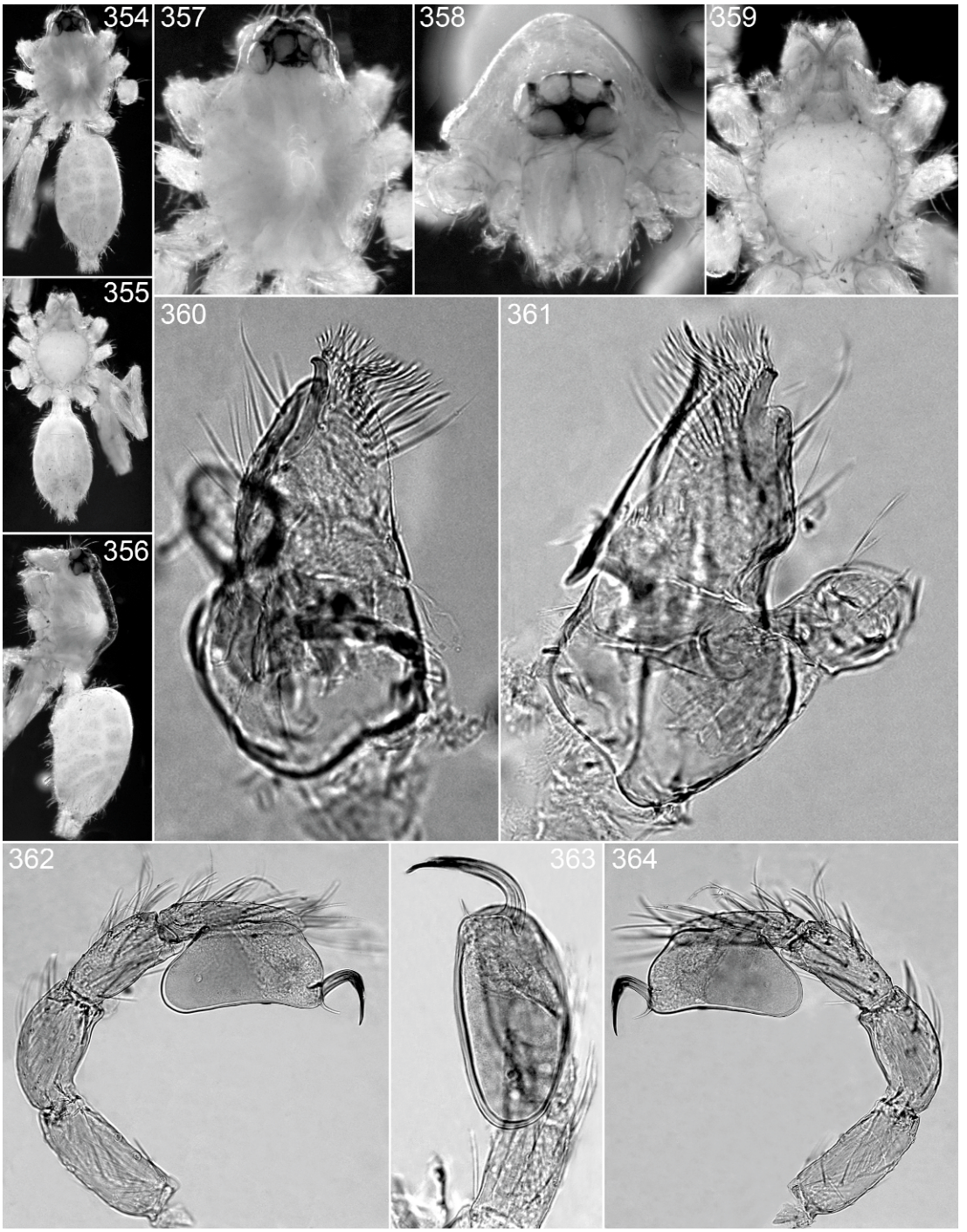
Heteroonops saba, new species

Figures 382–400

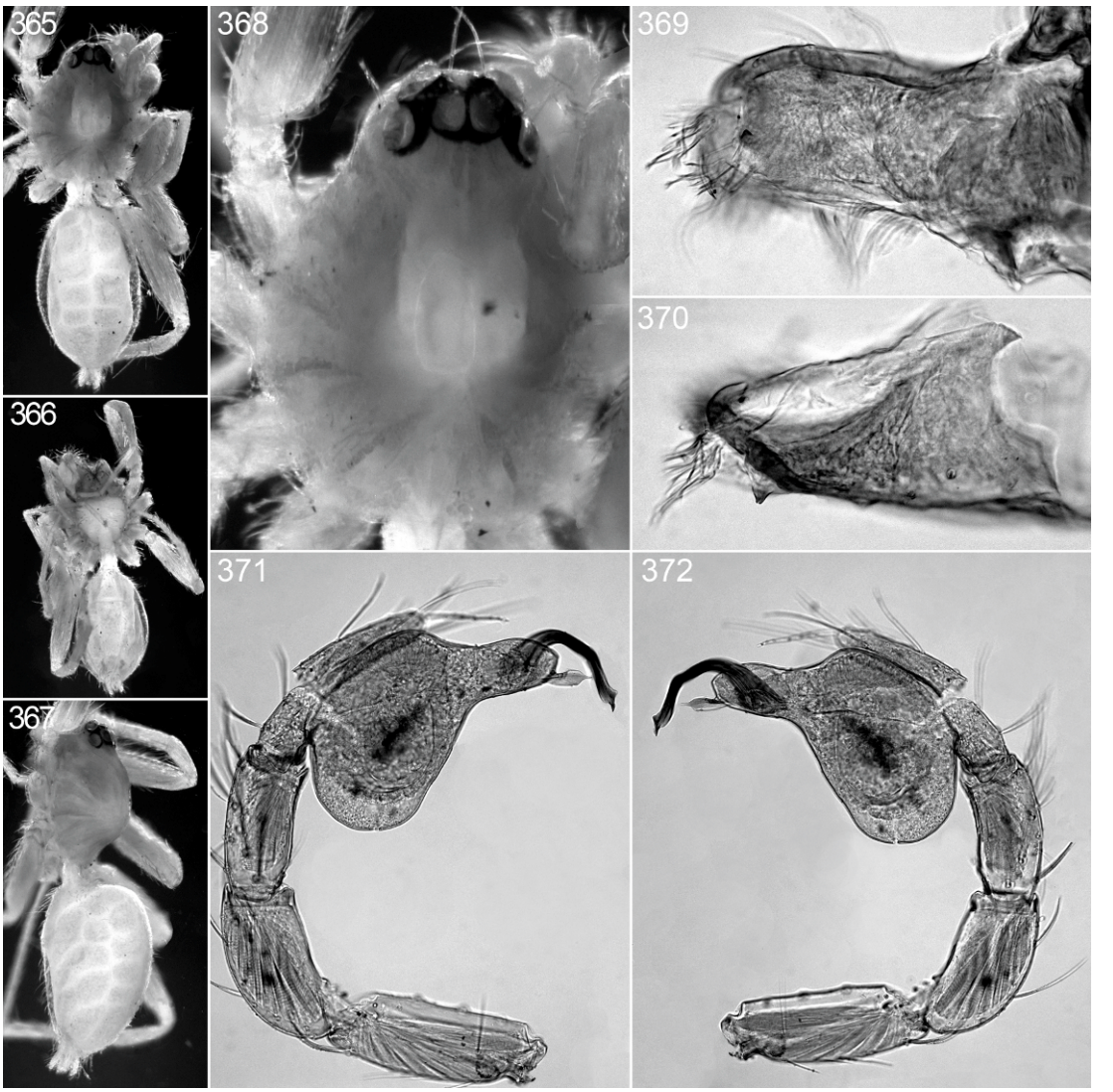
TYPES: Male holotype, female allotype, and five female paratypes beaten from rotten foliage on Mt. Scenery, Saba Island, Leeward Islands (Jan. 12–14, 1968; B. Malkin), deposited in AMNH (PBI_OON 1752).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the recurved, tongue-shaped projection on the endites (figs. 387–389) and by the relatively long embolus and long, very narrow, spiniform conductor (figs. 390, 391), females by the posteriorly very narrow anterior receptaculum (figs. 398–400).



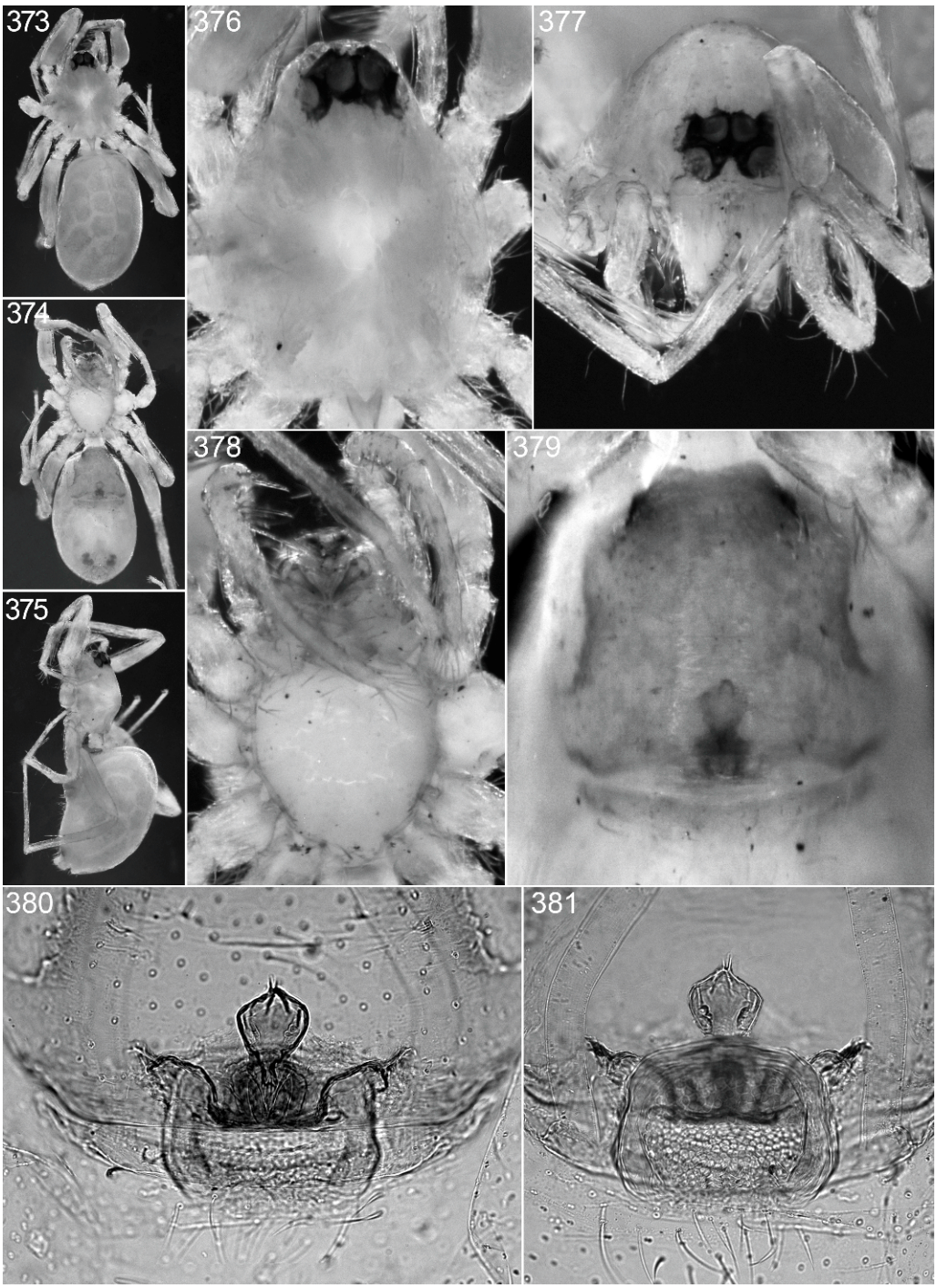
Figs. 354–364. *Heteroonops toro*, new species, male. **354.** Habitus, dorsal view. **355.** Same, ventral view. **356.** Same, lateral view. **357.** Carapace, dorsal view. **358.** Same, anterior view. **359.** Cephalothorax, ventral view. **360.** Endite, retrolateral view. **361.** Same, ventral view. **362.** Palp, prolateral view. **363.** Same, ventral view. **364.** Same, retrolateral view.



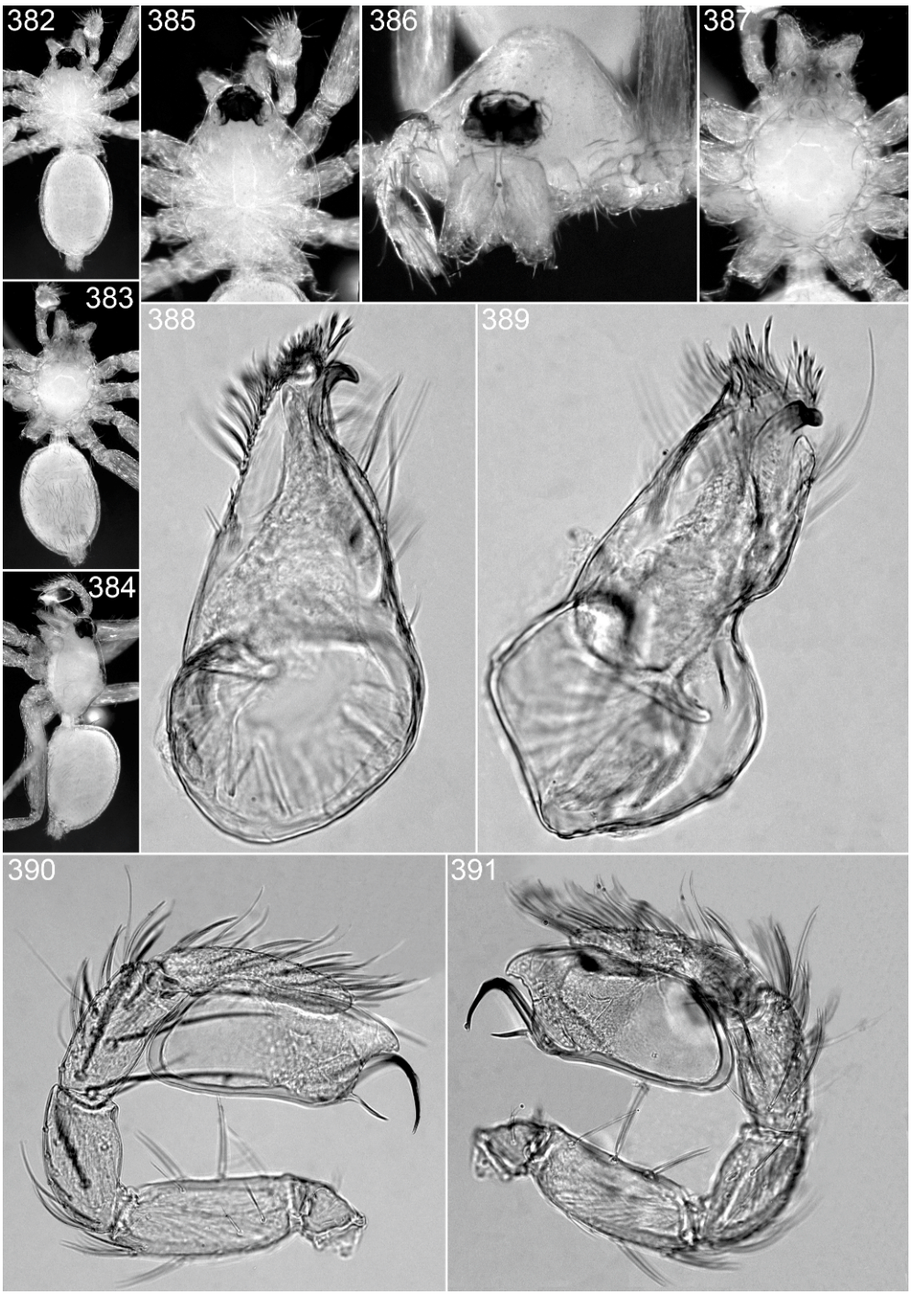
Figs. 365–372. *Heteroonops croix*, new species, male. **365.** Habitus, dorsal view. **366.** Same, ventral view. **367.** Same, lateral view. **368.** Carapace, dorsal view. **369.** Endite, ventral view. **370.** Same, retrolateral view. **371.** Palp, prolateral view. **372.** Same, retrolateral view.

MALE (PBI_OON 38266, figs. 382–386): Total length 1.34. Endites each with one posteriorly directed projection (figs. 387–389). Abdominal venter with pair of subcuticular slightly darkened spots just anterior of spinnerets. Leg spination: femora: I d1-0-0; III d0-0-1; tibiae: III d0-1-0, p1-0-0, v0-1-1, r1-0-1; IV p1-0-0, v0-0-1; metatarsi: III v2-2-0; IV p1-0-1, v0-1-0, r1-0-1. Embolus long, narrow, evenly curved, conductor long, very narrow, spiniform (figs. 390, 391).

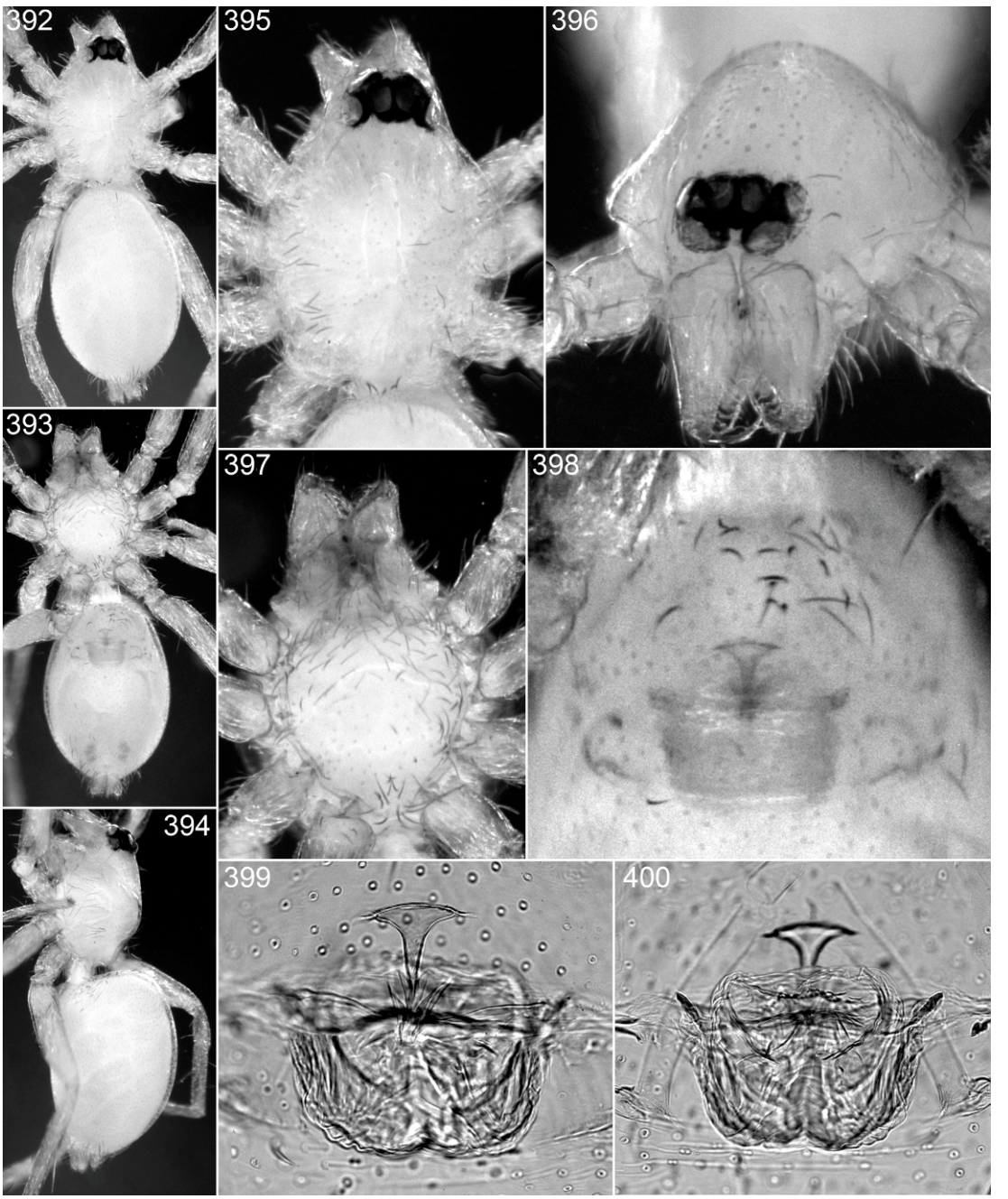
FEMALE: (PBI_OON 38266, figs. 392–397): Total length 1.72. Palpal patella elongated but not prolaterally dilated. Leg spination: femora: II d1-0-0; IV d1-0-0; tibiae: I v4-2-0; II v3-2-0; III d0-1-0, v0-0-1; IV d0-0-1, p0-0-1, v0-1-0; metatarsi: I v2-2-0; II v1-0-1; III v2-0-0, r1-0-1; IV p1-0-0, v0-1-0, r1-0-0. Palpal



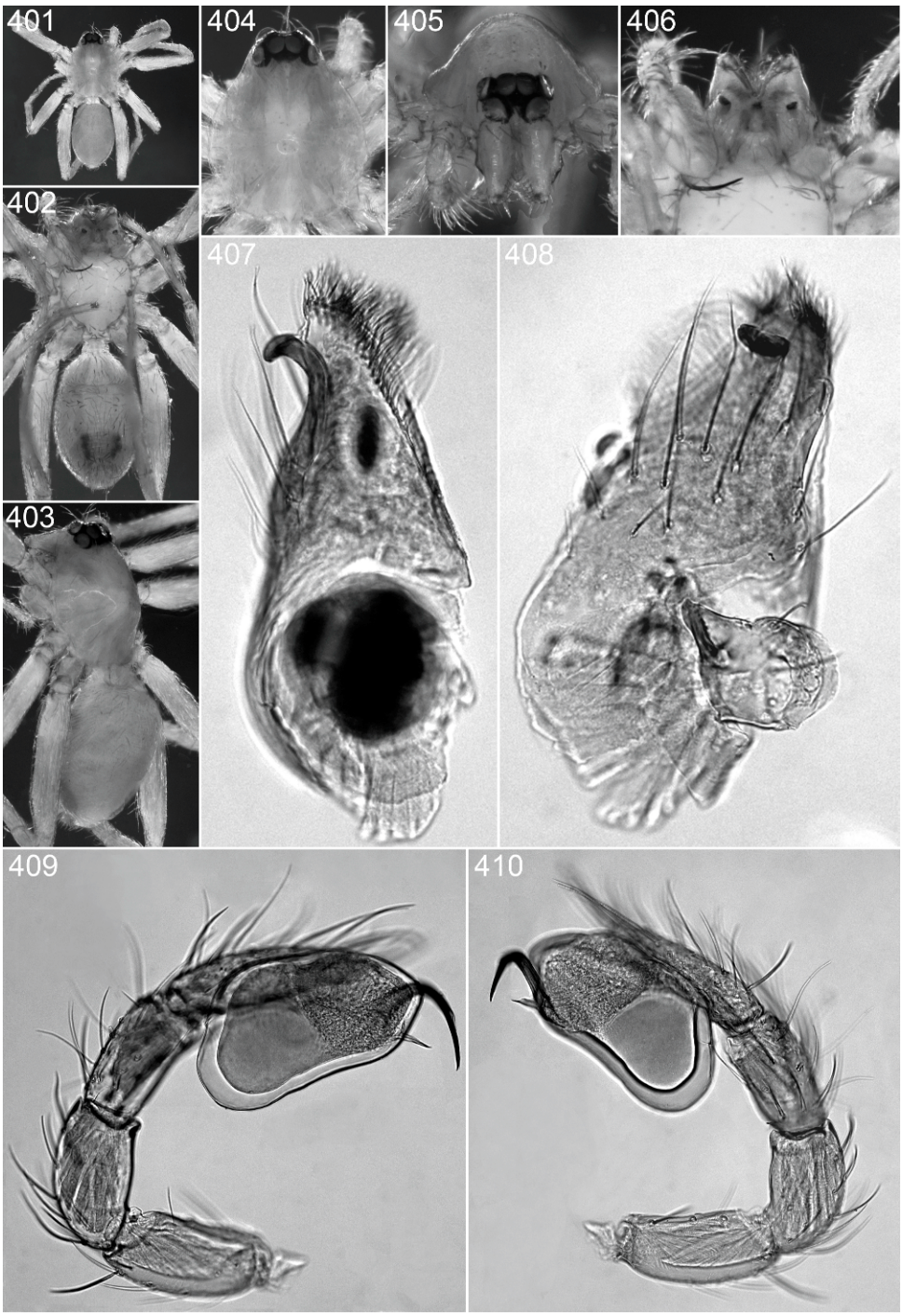
Figs. 373–381. *Heteroonops croix*, new species, female. **373.** Habitus, dorsal view. **374.** Same, ventral view. **375.** Same, lateral view. **376.** Carapace, dorsal view. **377.** Same, anterior view. **378.** Cephalothorax, ventral view. **379.** Epigastric region, ventral view. **380.** Genitalia, ventral view. **381.** Same, dorsal view.



Figs. 382–391. *Heteroonops saba*, new species, male. **382.** Habitus, dorsal view. **383.** Same, ventral view. **384.** Same, lateral view. **385.** Carapace, dorsal view. **386.** Same, anterior view. **387.** Cephalothorax, ventral view. **388.** Endite, prolateral view. **389.** Same, ventral view. **390.** Palp, prolateral view. **391.** Same, retrolateral view.



Figs. 392–400. *Heteroonops saba*, new species, female. **392.** Habitus, dorsal view. **393.** Same, ventral view. **394.** Same, lateral view. **395.** Carapace, dorsal view. **396.** Same, anterior view. **397.** Cephalothorax, ventral view. **398.** Epigastric region, ventral view. **399.** Genitalia, ventral view. **400.** Same, dorsal view.



Figs. 401–410. *Heteroonops macaque*, new species, male. **401.** Habitus, dorsal view. **402.** Same, ventral view. **403.** Same, lateral view. **404.** Carapace, dorsal view. **405.** Same, anterior view. **406.** Anterior portion of cephalothorax, ventral view. **407.** Endite, retrolateral view. **408.** Same, ventral view. **409.** Palp, prolateral view. **410.** Same, retrolateral view.

spination: femur v0-1-1, patella p1-1-0, tibia p1-1-1, v1-1-0, tarsus v1-1-0. Anterior receptaculum greatly widened anteriorly, narrowed posteriorly; posterior receptaculum rectangular (figs. 398–400).

OTHER MATERIAL EXAMINED: LEEWARD ISLANDS: **Montserrat:** Hope Gaut, 16°45.219′N, 62°12.623′W, May 24, 2003, leaf litter, large kapok tree, elev. 1098 ft (K. Marske, AMNH PBI_OON 37073), 1♀. **Saba:** Mt. Scenery and Bud's Hill trail junction, 17.6327°N, 63.2398°W, Mar. 14, 2008, beating, sifting, shrubs, elev. 671 m (J. Slowik, UAM 15648, PBI_OON 36829), 1♀; trail to Spring Bay, ca. 2 km in, 17.633°N, 63.224°W, Mar. 10, 2008, beating, sweeping, sifting, shrubs, elev. 191 m (J. Slowik, UAM 15650, PBI_OON 38266), 1♂, 1♀.

DISTRIBUTION: Leeward Islands (Saba, Montserrat).

Heteroonops macaque, new species

Figures 401–410

TYPE: Male holotype taken in rainforest leaf litter at an elevation of 2300 feet (700 m) on Middleham Falls Trail, Cochrane, W of Morne Macaque, 15°20.852′N, 61°20.698′W, Dominica (Apr. 29, 2006; Z. Prusak), deposited in FSCA (PBI_OON 27626).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *H. saba* but can be distinguished by the shorter palpal conductor (figs. 409, 410) and the distally longer endite projection (figs. 406–408).

MALE (PBI_OON 27626, figs. 401–405): Total length 1.59. Endites each with one posteriorly directed projection (figs. 406–408). Abdominal venter with pair of subcuticular dark spots just anterior of spinnerets. Leg spination: tibiae: I v0-1-0; III v0-1-0; IV v0-1-1, r0-0-1; metatarsi: I v2-2-0; III v0-1-0; IV r0-0-1. Embolus long, originating subapically, conductor long, very narrow, spiniform (figs. 409, 410).

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Leeward Islands (Dominica).

ACKNOWLEDGMENTS

We thank the following colleagues for access to specimens: Joe Beatty (JAB), Jonathan Coddington (USNM), Charles Dondale (CNC), G. B. Edwards (FSCA), Neal Evenhuis and Shepherd Myers (BPBM), Gonzalo Giribet and Laura Leibensperger (MCZ), Charles Griswold and Darrell Ubick (CAS), Rudy Jocqué and Wouter Fannes (MRAC), Seppo Koponen (ZMUT), John Murphy, Raymond Pupedis (PMY), Robert Raven and Barbara Baehr (QMB), Michael Roberts, Christine Rollard (MNHN), Petra Sierwald (FMNH), Joey Slowik (UAM), and Carlos Víquez (INBIO). We especially thank Barbara Baehr, Cristian Grismado, and Darrell Ubick for their help in actively seeking out relevant specimens and for their careful reviews of a draft of the manuscript, all the participants in the oonopid PBI project for their input, and Steve Thurston for composing the plates. This work was supported by the National Science Foundation (grant DEB-0613754).

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